ANNUAL REPORT

OF THE

DEPARTMENT OF REVENUE SETTLEMENT AND AGRICULTURE

FOR

1883-84.

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DEPARTMENT OF REVENUE SETTLEMENT AND AGRICULTURE,
MADRAS, 16*th September* 1884.

No. 2040A.

From

W. WILSON, Esq.,
Director of Revenue Settlement and Agriculture,
Madras,

To

H. E. STOKES, Esq.,
Secretary to Government, Revenue Department,
through the Board of Revenue.

SIR,

I have the honor to submit the following report on the administration of the Department of Revenue Settlement and Agriculture during the year 1883-84.

2. The operations of the Settlement Department and of the Inam Commission and Irrigation Accounts, which are also under the control of the Director, are separately reported on, but, in order that the whole of the work dealt with by this department may be exhibited in a single view, they will be briefly noticed here also and first of the—

3. SETTLEMENT DEPARTMENT.—The accounts of Ganjam, the revision of the assessments of which was completed in last year, were finally closed in this, and the number of districts, the assessments of which have been revised, was thus raised from 10 to 11. The settlement of the North Arcot, South Arcot and Madura Districts and of the Nílgiri plateau was also in progress during the year, and the enquiry into the Malabar escheats which was ordered in 1882 was taken up, the conduct of the operations being entrusted to a specially selected officer, Mr. A. E. C. Stuart, who had before that been engaged on the settlement of Goomsur in Ganjam. The enquiry, so far, has been confined to the Nílgiri parishes of the Wynaad, and very great progress had been made, a good number of cases reported on and a vast mass of valuable information got together and made available for ready reference by the end of the year.

4. The Settlement Department has now been at work for 26 years, and in that time has dealt with an area of Acres 12,933,493. This is the area by survey, and it is Acres 12,08,386 or 10 per cent. in excess of the area of the land dealt with, as recorded in the old Revenue accounts. The immediate financial result of the re-settlement of districts was an addition of Rs. 16,39,553 to their former assessments; this increase of revenue represents a return of 7·3 per cent. on the outlay, which, to date, amounts to Rs. 2,22,38,700, of which Rs. 75,29,507 represent the expenditure on settlement and Rs. 1,47,09,193 that on survey. In the year under report, Rs. 2,79,689, or Rs. 47,512 more than in the preceding year, were spent on settlement, the area dealt with being Acres 2,41,058 or 376·6 square miles. Rs. 7,71,838 were spent on survey, the area dealt with being 1,586 square miles of Revenue Survey and 3,027 square miles of Topographical.

NOTE.—In the report for 1882-83, the total area dealt with was entered as Acres 12,803,674. The correct figure was 12,692,435 acres.

5. INAM DEPARTMENT.—During the year, 72,570 acres of Inam land, the full assessment of which was Rs. 1,00,560, were enfranchised on a quit-rent of Rs. 55,795: the number of title-deeds issued was 5,652, but besides these cases, the department dealt also with 424 more wherein the grants were resumed and fully assessed. Of the title-deeds issued, 5,244 were for village service inams, 52 for religious and charitable institutions and 356 for personal grants.

6. The primary inquiries into the cases disposed of were for the most part conducted, as in former years, by a Special Deputy Collector, who, in the year under report, was employed in the Cuddapah and North Arcot Districts.

7. From the first beginning of its operations in 1859 till the end of last year, the department had dealt with Acres 6,752,803, the full assessment of which was Rs. 1,06,13,894, and the financial result of the Commission's work was, including the assessment of inams that were resumed and fully assessed, an addition of Rs. 18,06,696 to the revenue of the Presidency. This very considerable and permanent increase to the finances of the empire has been gained at a total cost of Rs. 13,95,387—a sum which is Rs. 4,11,309 less than the amount of a single year's revenue secured by the Commission.

8. Irrigation Accounts.—In last year's report, it was intimated that the system of distributing the revenue derived from irrigated lands between land revenue proper and water rate, which has been adopted for the great Capital and Revenue works of the Presidency and for works for which, individually, a continuous Revenue record is maintained, had been for the first time extended to all the irrigation works in the Presidency. The main object in view was to bring prominently to notice the great value to the public revenue of the agricultural works of the Presidency, which, large in number but generally small in capacity, are accounted for to Government in the lump, and to show how important it was that their efficiency should be maintained. The result of the inquiry which was presented to Government at the beginning of December 1883 did not disappoint the expectations that had been formed of it. The enquiry has been continued this year and the revenue accounts of all works of irrigation will henceforth be dealt with on the same system so far as relates to the separate exhibition of land revenue proper and water rates.

9. The details of the year's irrigation will be reviewed as in last year in a separate report, which will be submitted as soon as the accounts of the Chittoor Taluk, the submission of which has been delayed owing to the introduction of the revised settlement, are received; they are expected very shortly. The Revenue accounts of all works for which Capital and Revenue accounts are kept and of those for which a continuous Revenue record is maintained have been already submitted.

10. In this connexion it may be mentioned that, on consideration of figures placed before Government by the Director in the course of the year, the Government of India has reduced the charge in the Civil Department for collecting irrigation revenue from 7·2 to 5 per cent. with effect from the 1st April 1884.

11. Department of Agriculture.—The year's work will be reviewed in the order of sub-division prescribed by the Government of India in their Resolution, No. 54-A, dated 28th April 1884.

12. I. *Organization and maintenance of Village Records.*—The only matter that is worthy of note under this head is the discussion that took place on the question of improving the *status* and *personnel* of Revenue Inspectors, or, as they are called in other provinces, *Kanungoes.* The Director proposed that the office should be declared to be an office qualifying for the office of Tahsildar, and that, after a prospective time to be fixed, no one should be appointed a Tahsildar who had not been a Revenue Inspector for at least a year. Further, in order to secure the right type of officer, that is to say, men young, active and educated, to whom it was intended by the first of these proposals to offer a career, it was proposed that, after a time to be prescribed, no one should be appointed to be a Revenue Inspector who had not either passed by the lower Revenue test or gone successfully through the Agricultural College at Madras. These proposals were not accepted in their entirety, but service in the office of Inspector now qualifies for a Tahsildari, and Government and the Board have concurred in the opinion that an examination embracing not only the Lower Revenue test, but also surveying, plotting and the calculation of areas from maps should be passed by Inspectors, but definite orders on the subject have not yet been issued. It seems to have been thought that the Director's proposals regarding appointment to the office of Tahsildar would unduly limit the field of selection.

13. II. *Analysis of Districts with reference to security from Famine.*—In last year's report, it was intimated that a skeleton sketch of what seemed to be necessary to meet the requirements of the Government of India, as set forth in paragraphs 9 and 10 of

their Resolution of the 8th December 1881, No. 6-340-50-G, would be drawn up and a portion of the establishment employed, when it could be spared, in filling up the details. The sketch was drawn up and the district of Kurnool, which, judged by the loss of population, suffered more severely than any of the districts that were stricken with famine between 1876 and 1878, was taken in hand. So far as materials are available here, the analysis is nearly completed, but the enquiry has revealed how much is wanted to make the analysis as complete as the Government of India wish it to be. So far as the district generally, or certain well-defined sections of it, are concerned, the information that is available in this and the Board's offices would suffice for broad and tolerably accurate conclusions regarding its agricultural conditions, but the Government of India prescribe an analysis that is much too minute to be satisfied without considerable local enquiry. The information at head-quarters does not generally go below taluks, whereas the requirements of the Government of India demand an examination of the conditions of villages. One point that the investigation so far has accentuated is the necessity of referring all irrigation works to their drainage basins and discussing and valuing them in reference thereto. The great mass of the ordinary agricultural irrigation works of the country are now dealt with as isolated units, but it is obvious that, to satisfy the requirements of this analysis, they must be brought together and treated as parts of drainage systems.

14. This analysis has involved considerable labor, and any rapidity of progress will be impossible without other help than the ordinary establishment of this office can afford. It was stated in last year's report that extra aid would not be asked for unless and until it was found to be necessary. It is thought that the required aid may be obtained without further expenditure by the employment—on the abandonment (if this be sanctioned as proposed) of the farm at Saidápet — of the Agricultural Reporter and the staff of Agricultural Inspectors the entertainment of whom has been adverted to in this office letter, No. 1822 A, dated 16th August 1884, in which was discussed the question of the lines on which the agricultural policy of the Presidency should move and will be further discussed in a separate communication.

15. III. *System of collection of Revenue and Rental in precarious Tracts.*—Reference was made in last year's report (paragraph 15) to a discussion that had taken place regarding the periods at which the instalments of the revenue should be fixed to be paid in the different districts. Government, concurring with the Board of Revenue, were not, it was observed, disposed to interfere with present arrangements, but directed further enquiries to be made, and especially through Mr. Lakshmikanta Row, who was at the time employed as a Deputy Director of Revenue Settlement in North Arcot. That officer submitted the result of his enquiries in that district, and his recommendations were referred to the Collector, Mr. Stuart, for remarks. North Arcot is one of the districts in which the first instalment falls early, viz., in November. Both gentlemen were of opinion that the kists should be thrown back and fall later, and the Collector has now been asked whether an arrangement recently proposed for Nellore, whereby the instalments run from February to June, would not suit his district too. Both he and Mr. Lakshmikanta Row proposed that the instalments should run from December, but this seems rather early considering the time when the chief crops of the year are reaped.

16. IV. *Measures of Protection*—(1) *Fodder Reserves and Arboriculture.*—These matters are chiefly dealt with by the Forest Department, which is separately administered, and by Local Fund Boards. From the Forest Administration Reports for the year, it appears that the area of reserved forests in the Presidency at the end of 1883-84 was 2,869 square miles, of which 132½ square miles were reserved in the year under report. These figures are exclusive of the Nallamalai Forest in Kurnool, the sholas and the slopes of the Nílgiri Hills towards Coimbatore and Malabar, the Bolampatti Valley, Thadagam and portions of the Anaimalai Forests in Coimbatore, three blocks in the Pachaimalais in Trichinopoly and three blocks in Madura the areas of which are unknown. Road avenues are the property of Local Fund Boards; there is not, it is believed, any record of the total length of them in miles. The area of topes and orchards, excluding palmyras and cocoanuts, was in 1882-83 (Fasli 1292)—the latest year for which information has been published by the Revenue Department—Acres 3,25,000; this does not include zemindaries.

17. The attention of the Forest Department was directed during the year to the reclamation of sandy wastes on the coast by the planting of sand-binding creepers and other means.

18. In this department, the chief operations of the year were the planting up of three acres of the farm land with *Divi-divi* (*Cæsalpinia coriaria*) and the importation from Queensland of a large quantity of Eucalyptus seed for distribution to districts.

19. The Australian Salt Bush (*Atriplex nummularia*) appears to have done fairly well at the farm, where some of the plants have seeded. Attention also was, at the suggestion of Mr. Robertson, given to the discovery of indigenous salt-feeders which might be found to be as effective in the reclamation of saline soils and as useful for fodder as the bush of Australia. One variety found at Ennore in the neighbourhood of Madras which cattle eat freely was identified by Professor Lawson as the *Obione konigu.*

20. (2) *Extension of Communications.*—Sanction was accorded to the construction of two new lines of railway—the one from Bezváda, at the head of the Kistna Delta, to Guntakal in Bellary, the other from Nellore, at the head of the Pennér Delta, to Tirupati in North Arcot. Both lines are designed for famine protection and the construction of both has been commenced. The 40-mile section of the Bellary-Hoobli Railway between Bellary and Hospet on the Tungabhadra was opened for traffic on the 24th March 1884. The surveys in connection with the proposed extension of the Madras Railway from Beypore to Calicut were completed and laid before Government with the estimates. The survey of the proposed railway from Máyavaram to Mutupet in Tanjore was completed, and the surveys and estimates for the proposed alternative lines from Tinnevelly to Quilon and Trivandram were laid before the Travancore Government.

21. It has been proposed to connect Bezváda at the head of the Kistna with the coal-field of Singareni, some 80 miles off in the Nizam's Dominions, and to continue the line thence through Warangal to Hyderabad, and surveys in connection with this scheme were undertaken during the year by the Nizam's Guaranteed State Railway.

22. The survey of the proposed line from Vizagapatam to Raipur was completed, but its construction has, it is believed, been postponed.

23. The survey of the line by which it is proposed to connect Vellore, on the Madras Railway, with the South Indian Railway at Villapuram, *viâ* Pólúr and Trinomalai, was nearly completed.

24. (3) *Irrigation.*—No new works of any importance were sanctioned during the year and but little expenditure appears to have been incurred on the Barúr, Periyár and Rushikuliya Projects, all of which were sanctioned last year.

25. The minor irrigation works of the Presidency, that is, speaking generally, all works irrigating less than 200 acres, are now managed in the Revenue Department, and with more liberal maintenance grants, it has lately become possible to give them an attention that they have long needed.

In the year under report, Rs. 3,53,807 were allotted for the repair of nearly 2,000 of these works, which irrigated a nominal area of more than 112,000 acres assessed at nearly Rs. 6,00,000, and of this amount Rs. 3,20,773 were spent. There is no record immediately available of the revenue annually lost under these works.

26. Lands irrigated from wells sunk in dry land have in this Presidency been long exempted from extra assessment on this account, but lands, whether wet or dry, irrigated from wells sunk in irrigated lands, have not hitherto shared in the exemption, though the propriety of excluding them from it has been questioned. The question was re-opened this year in consequence of a letter addressed to Government by Mr. P. Chentsal Rau, late Head Sheristadar of the Board of Revenue but now Superintendent of Stamps and Stationery, in which he urged the extension of the principle, in part at least, to lands irrigated from what are known as "ayacut" wells: he was of opinion that the extension would be to the advantage at once of the Government and the people: the sinking of such wells would be encouraged and their number largely increased; the crops, and therefore the revenue, would be rendered more secure; the stock of food would be increased and the general wealth and comfort of the people promoted.

27. The Director, to whom Mr. Chentsal Rau's letter was referred for remarks, submitted proposals the effect of which would have been to free irrigation from wells, wherever situated and whatever the nature of the land, irrigated or unirrigated, that received its supply from them, provided the wells were the *sole* source of supply.

The Director's views were not accepted by the Board of Revenue, which, observing that the question had been very fully discussed some years ago and settled on its present basis, deprecated the re-opening of it. The question was before Government and had not been finally settled when the year closed.

28. V. *Agricultural Experiments including Farms*—(1) *The Government Farm and School of Agriculture at Saidápet.*—Up to the end of the year under report, these institutions continued to be managed by a single officer, who was at once Superintendent of the Farm and Principal of the School. In his former capacity he was controlled by the Revenue Department, in the latter by the Director of Public Instruction. This system of dual control was not found to work well, and, as the result of a discussion that took place during the year, it was resolved that from the 1st April 1884 the arrangement should cease and be replaced by a new system whereby the school and farm were completely disconnected the one from the other, managed by separate staffs and controlled by distinct authorities. The farm was assigned to the Department of Agriculture, the school was placed under the Director of Public Instruction.

29. The operations of the farm were conducted by the former Superintendent, Mr. Robertson, but the report has been submitted by Mr. Benson, who, in consequence of Mr. Robertson's transfer to the Educational Department, in pursuance of the policy that has just been referred to, was appointed to the offices of Agricultural Reporter to Government and Superintendent of Government Farms from the 1st April 1884. Towards the close of the year, too, the Agricultural Reporter was appointed Editor of the agricultural sheets of the District Gazettes, his functions in this regard being to draw up, for publication therein, notes on matters of agricultural interest.

30. In his opening remarks, Mr. Benson, who during the year was almost entirely engaged in the educational work of the school, refers, as he has done on several other occasions, to the difficulty experienced in affording the classes instruction in practical agriculture, and reiterates what he has repeatedly urged that "practical instruction cannot be satisfactorily given except to small classes." The tendency of the classes at the Agricultural College seems to be only to increase, and it would be absurd, therefore, on Mr. Benson's own showing, to make, as in paragraph 24 he proposes to do, the management of the farm in any way dependent on the "arrangements to be made for the training of the students at the college in the practical work of farming operations." It has been held by gentlemen, whose opinions as agricultural educationists have been quoted with approval in the discussions that have occurred from time to time as to the course which agricultural education should take in this Presidency, that no attempt should be made at a school of agriculture to give instruction in practical farming, but that the instruction given there should be theoretical and scientific only, the practical art of agriculture being learned elsewhere and before the student enters the school. Mr. Benson's repeated testimony to the difficulties attending the instruction in practical agriculture of the students at the college at Saidápet seems only to confirm the opinion of those scientists.

31. The Agricultural Reporter, Mr. Robertson, made no tours during the year, but, during the vacation of the school in July and August 1883, Mr. Benson was deputed to the Kistna and Godávari Deltas to investigate, as far as possible, the causes and history of certain diseases, parasitic and other, from which tobacco and paddy were reported to have suffered for some time past; to report on the cultivation and cost of production of sugar in the Godávari; to make, in communication with the Revenue officers of the district, certain trenching and draining experiments having for their object the solution and washing out of "choudoo" (a salt of soda), by which considerable areas in the Delta of the Kistna were at one time seriously deteriorated; and to report generally, as far as he could, on the agricultural systems and conditions of the two districts. Mr. Benson's report has been separately reviewed, and several notes on tobacco and other matters of interest based on his reports and on other information, were published and distributed during the year.

32. The area of land in the Kistna Delta now affected by "choudoo" appears to be small—a result probably due to continued irrigation.

33. The year's operations on the farm were, Mr. Benson says, conducted chiefly in the interests of the students at the Agricultural College, to which it was, practically, therefore, an educational annex. It was suggested that the grant in the educational budget for the maintenance of the botanical grounds, where experiments on a small scale have heretofore been carried on, should be transferred to the Agricultural Department, which should, it was thought, have the direction of all experiments in agriculture; but Government decided that the grounds should be attached to the College, and Mr. Benson now asks whether the farm is to carry on operations of the same kind as those in the botanical grounds hard by, and observes that it is "questionable whether the conditions of the farm render it suitable for experimental work, except of an elementary character and to a limited degree." These are matters which will be dealt with separately and in connection with some recent correspondence which has raised the issue whether the farm at Saidápet should not be abandoned.

34. The agricultural conditions of the year were very unfavorable, their characteristics being long droughts followed by drenching rains. The consequence was the universal loss of the grain crops from insects, rust,* mildew and other diseases. The only crops, indeed, that appear to have done even fairly well were the crops grown for fodder, raggi, the yield of one field of which Mr. Benson notes as "remarkable," and some of the irrigated paddy.

* At the end of paragraph 35, Mr. Benson writes—"Mildew, which is supposed to be an early stage of rust." The contrary is the case according to Mr. W. Carruthers, who says that the result of his investigations is to show that *rust* is an earlier stage in the life history of the fungus that produces mildew.

35. Among the experiments undertaken at the farm during the year was the trial of some red and white wheat from the Panjaub. The result was encouraging. "This," says Mr. Benson, "is the only time that wheat has yielded even fairly on the Saidápet Farm." The present area of wheat in this Presidency is very limited, but the success of this experiment and the promising prospects of an English market for Indian wheat led the Director to draw the attention of the Collectors—both of districts where it is now grown and of those where it is not—to the question of wheat-growing, and arrangements have been made for further supplies of seed in the present year.

36. The experiments with manures that have been conducted for some years past were continued, and some new ones were tried, the most noticeable of which was with common salt used as a topdressing for raggi and *Sorghum Saccharatum*. The results seem definite enough so far as comparison with the yield from unmanured land goes—the yield in both cases, both of grain and straw, was largely increased—but Mr. Benson says of the one experiment that the "results gave no decided result," and of the other that "the results (*quære* 'experiments') were not duplicated and could therefore scarcely be trusted." He may perhaps, in writing, thus refer to the results obtained from varying quantities of salt or to the results of the different manures experimented with, but as the summation of all that has been done in this direction, Mr. Benson at paragraph 87 "doubts whether any really useful manuring experiments can ever be carried out on the Saidápet Farm," and in a separate communication, since received, he has emphasized this doubt by expressing the opinion that to experiment there with manures is "a waste of time and money." It is a somewhat unprofitable task to have to review experiments that have so little value and been apparently so misdirected.

37. The only other agricultural experiment of the year that seems to demand notice was one intended to show what quantity of water on soils like those at Saidápet produced the best returns. The results were necessarily somewhat vitiated by the heavy rainfall of November, but Mr. Benson thinks they point to the conclusion of all former experience, viz., that "the smaller quantity of water"—the supplies experimented with represented a rainfall of 1, 2 and 3 inches respectively—"produced the best outturn, and that a much smaller quantity of water than is commonly used by the ryots would suffice to produce very good crops."

Mr. Benson's conclusions would have been entitled to greater weight had they been supported by a comparison of the results of his experiments with the results of

irrigation on any given land of similar quality by an ordinary ryot and accompanied by information regarding the quantity of water which the ryot had used.

38. No part of the farm was worked as a commercial farm. The question of commercial, as distinguished from experimental, farming was discussed at the Statistical Conference held last December in Calcutta, and the conclusion arrived at was that "Model farms should be purely experimental in character and should not be required to show profits, as financially judged, though experiments should be conducted with the view to their commercial value to the cultivator being ultimately ascertained." This latter dictum is entirely in accordance with what is believed to have been the intention of this Government when it desired that part of the Saidápet Farm should be set aside as a farm to be worked on commercial principles. It was not, it is believed, the intention of Government to farm for its own profit, but to prove to the ryot that it would be profitable to him to adopt the methods which Government recommended to his notice. In the present circumstances and prospects of the farm, the matter does not seem to demand any further notice.

39. (2) *Other Farms.*—Farms under the auspices of the Collectors and managed by committees of native gentlemen were, in the course of the year, started in the Madura and North Arcot Districts, the object aimed at in both cases being the improvement of agriculture and agricultural stock. Neither farm has any official character, but such encouragement as was possible was given to both in the gift of stock. The Association of North Arcot got up a most creditable and successful exhibition at Chittoor, the head quarters of the district, in the early part of 1884.

An application was received during the year through the Collector of Coimbatore from the Rev. H. Little, a missionary residing at Karúr in that district, for Government aid to help him in starting an industrial farm for the benefit of certain families connected with the mission. It was proposed to entertain a trained agriculturist from the farm at Saidápet, and it was hoped that the farm would serve as an educational institution for the sons of the native agriculturists in the neighbourhood. The scheme, which had the general support both of the Collector and the Director, was still under correspondence at the close of the year.

40. (3) *Miscellaneous*—(i) *Distribution of Seed and Plants.*—A statement of the quantities and varieties of seed and plants distributed from the farm at Saidápet during the year will be found on page 6 of Mr. Benson's report. The reports from districts had not been received when the report was submitted, but they have been received since. The results of the district experiments were almost universally failures—a result attributable in all probability to want of interest or want of knowledge on the part of those to whom the experiments were entrusted by district officials. One very useful and interesting fact was elicited as the result of an experiment made by Messrs. Minchin and Co., of Aska, with *Sorghum Saccharatum*—viz., that though it may be impossible to make a marketable sugar from the syrup of this plant, its fresh juice may be fermented and used by the distiller for the manufacture of spirits.

41. (ii) *The Sale and Distribution of Agricultural Implements.*—Some dressing machines and a cake-crusher were imported through the agency of the farm for a native agriculturist of Shiyáli in Tanjore, and a set of Howard's "ryots' implements," a simplex hoe, a winnowing machine and a seed-drill were imported for the farm. The "ryots implements" were tested, but under too unfavourable conditions to justify a judgment on their merits. The seed-drill is described as an effective implement, but its price (Rs. 77) must put it beyond the reach of the great bulk of native agriculturists. It having been ascertained that in thirteen of the twenty-two districts of the Presidency, no kind of seed-drill was in use, drawings of that used in North Arcot, Nellore and some other districts were circulated and working models of the drill were at the subsequent request of the Collectors made up and supplied to eight of the districts in which they were theretofore unknown. The cost of this drill—which, though by no means equal to an English one, is yet a very effective implement—varies from 5 to 10 rupees.

42. A distinct advance has been recently made in bringing improved ploughs and other implements to the notice of the ryots. Formerly, Government had to do everything, and its all was not much. Now, private enterprise has taken its place and with no little success. Messrs. Massey and Co., of Madras, have undertaken to supply free

of charge any of their ploughs for exhibition and trial to any district the Collector of which may indent for them, and a very large number of their ploughs were on these terms distributed to districts during the year; they sold no less than 587-206 being of the type known as the "improved country plough." This enterprising firm gave their attention also to, and experimented with, left handed mould-board ploughs, the advantage of which had, as noted in last year's report (paragraph 46), been urged by Mr. Weld, the Sub-Collector of South Arcot. The agricultural advisers of Government, who had them tried, did not regard them with favor. Messrs. Massey and Co. also gave their attention, and not unsuccessfully—though they are not yet quite satisfied with the results—to the fitting of shares and mould-boards to the wooden frames of ordinary native ploughs. This they hope to be able to do at a very moderate cost. Messrs. Thomson and Mylne, of Beheea, with whom the department has been in correspondence during the year, have appointed local agents in Madras for the sale of their portable sugar-mills. They sold eighty-one from January to August in the current year of which seventy-five went to the single taluk of Hospet in Bellary. This firm, who also undertook the exhibition of their machinery at their own cost in the sugar districts of the Presidency, have offered to send skilled workmen in the coming season to exhibit the working of their new patent pan for boiling sugar.

43. The Swedish ploughs which were imported by Government last year, and distributed to every district in the Presidency, did not find much favor except in Bellary, where many have been bought. The objections generally made to them were that they were too dear and too heavy and could not be mended by local labor.

44. (iii) *Fibres*—(1) *China and Cashmere Silkworms*.—Twenty-one ounces of seed were received from Dehra Dun in December 1883, and 12½ oz. of the consignment were distributed to different persons, but no reports of the results of the experiments have been received except from the farm at Saidápet (page 40 of Mr. Benson's report), and from Major Pickance, the Superintendent of the Central Jail at Rajahmundry. Briefly, both experiments show that there is no difficulty in rearing silkworms in this Presidency during the cold weather, provided there is sufficient food for them. The supply of mulberry leaves failed in both instances, the consequence being at Saidápet a large mortality among the worms, which refused to feed on anything but mulberry leaves; the defective supply of mulberry leaves was at Rajahmundry supplemented by lettuce leaves. Both at Saidápet and at Rajahmundry, a number of cocoons was retained for seed, and it remains to be seen whether they have sufficient vitality to survive the hot weather of the Madras Presidency.

45. (2) *Tassar Silkworms*.—Mr. A. J. Stuart reported (Board's Proceedings, No. 2798, dated 17th September 1883) a most interesting experiment that he had made with the indigenous tassar silkworms found in his district of North Arcot. Cocoons found in the local jungles were placed in a bamboo cage suspended among the branches of a country almond tree, to which the worms, when hatched, had free access, feeding themselves on the leaves. The experiment, which cost very little showed that the worms were very hardy and required but little attention. Experiments were made by the Chemical Examiner having for their object the solution by a chemical agent of the cement which glues the fibres of the tassar cocoon so tenaciously together. The most successful of the agents used was a solution of one-fifth pound of the carbonate of potash in a gallon of water. Other agents that were tried, though perfectly successful as solvents, were found to injure the thread.

46. Mr. Cleghorn, Executive Engineer at Arrah, whose attention appears to have been drawn to Mr. Stuart's experiment, forwarded to the Board of Revenue at Madras some specimens of tassar silk reeled by him after solution by an agent the nature of which he declined to communicate but which he said was not any form of potash. The silk was of excellent quality.

47. (3) *Kol-nar*.—This fibre, a sample of which exhibited at the Madras Agricultural Exhibition of 1883 attracted the attention of the judges, was identified by Professor Lawson as the *Helicteres Isora*, and enquiries were instituted to ascertain its local distribution and the quantity that would be likely to be available for commerce. It is found chiefly in South Canara, Malabar, Kurnool, Ganjam and Coimbatore, but there is nothing accurately known as to the quantity that could be made available for

trade. A 1500-lb sample was procured from Kurnool and forwarded to Messrs. Arbuthnot and Co. for trial in their jute mills at Chittivalasa in Vizagapatam, but from a report that has been recently received from them it would not appear that this fibre is suitable for weaving: it is probably adapted only for cordage.

48. (4) *Aloes* (*Agave americana*).—This aloe is common enough in the hedge-rows and garden fences of the Presidency, but is not specially cultivated for fibre. At the instance of the Collector of Tanjore, a small grant of Rs. 50 was made to the Tahsildar of Mannárgudi for the experimental cultivation of this plant. The result will be reported in due course.

At the instance of the Director, the Government of Mauritius were asked to forward specimens of the "gratteuse" and "casse tête" used in that colony for the separation of the aloe fibre, but they have not yet been received.

49. (5) *Manilla Hemp* (*Musa textilis*).—Four hundred and fifty plants of this fibre-producing plantain, which is now thoroughly acclimatized in Madras, were, the Superintendent of the Government Farm reported, ready for distribution, and a large number were distributed throughout the Presidency in the course of the year. The experiments made at the farm for the separation and preparation of the fibre go to show that its cultivation might be made highly remunerative. The process of steeping and rotting the layers in clear water produced the "finest and whitest fibre" ever obtained on the farm.

50. (6) *The wild Plantain* (*Musa superba*).—The value of the fibre of the wild plantain for the manufacture of paper was brought to notice in papers received from the Government of India, and enquiries were instituted regarding its existence and distribution in this Presidency. It is found in most of the hill tracts of the Presidency, and the Government expressed their readiness to afford facilities to any firm that might be willing to try experiments with the fibre. A drawing also of a machine that had been designed by Messrs. Schœne, Kilburn and Co. of Calcutta, for crushing and dressing the fibre, was procured by Government through the Government of Bengal, and at their request furnished to Messrs. Harvey and Co., who are about to establish a paper mill at Pápanásam in the Tinnevelly District. Nothing practical appears to have yet been done in the matter.

51. (iv) *Japan Pea Seed.*—500 lb. of this seed were received from the botanical gardens at Saharanpore, but the seed was found, on arrival, to have entirely lost its vitality. Experiments with it were therefore impossible.

52. (v) In view of the market now opening for Indian wheat in England, the Collector of Kurnool sent down a sample of the red wheat grown in that district, asking whether it came up to the standard of the wheat exported to England from Northern India. The Agricultural Reporter, Mr. Robertson, to whom the sample was submitted, said that, though superior to any Madras-grown wheat that he had seen, it was much inferior to the wheat exported from Bombay, and that, though suitable perhaps for rolong or macaroni, it would not yield a good flour.

53. (vi) *Rust and Mildew in Wheat.*—Enquiries were, at the instance of the Government of India (G.O., No. 327, dated 5th March 1883), instituted in view of ascertaining whether these diseases were more common in fields where mustard and wheat were grown together than elsewhere, but the enquiries did not elicit much information. Specimens of plants affected by these and other fungoid diseases were collected and forwarded to the Government of India for transmission to Mr. Carruthers, the Consulting Botanist to the Royal Agricultural Society of England, whose investigations regarding these diseases had led to the Government of India's reference.

54. (vii) *Diseases affecting Paddy Plants.*—In accordance with G.O., No. 28, dated 11th January 1884, various specimens of paddy plants affected by insects or disease were collected and forwarded to Dr. Bidie, who was unable to identify the insects, owing in some cases to their undeveloped condition and in others to the state of decomposition in which they reached him.

The same disease seems in some instances to go by different names in different districts, but this will be ascertained from Professor Lawson, to whom it is proposed to forward specimens of affected plants for examination.

55. In this connection it may be mentioned that in consequence of the imperfect manner and condition in which specimens of plants intended for examination were in many cases received by him, Professor Lawson very kindly drew up and forwarded to the Director a set of instructions for the collection and preservation of plant-specimens intended for identification. These instructions were printed and communicated to all Collectors in this Presidency and to the Agricultural Departments of all other Provinces and Administrations in India.

56. (viii) *Acacia arabica or Black Babool.*—The bark and pods of this tree are useful for dyeing and tanning, and from a note circulated by the Government of India (No. 18, dated 6th February 1884), it appears that the seedless pods had been valued in London at £40 a ton and the bark at from £12 to £14. The tree grows freely throughout the presidency, and especially in tank-beds and in black cotton soils where other trees do not generally thrive. Mr. Gamble, the Conservator of Forests in the Northern Division, is of opinion that, should a demand arise for the bark and pods for use in the arts, a large trade in them might be developed in this Presidency; and arrangements have been made for the collection of a sufficiently large consignment for shipment to test the London market. The pods are at present chiefly used here as fodder, and the timber, which is very hard, for agricultural implements.

57. (ix) *Bat Guano.*--The existence of large deposits of bat guano in a cave called Yerrayari, situate in the Banganapalle Jaghire in the Kurnool District, was brought to notice during the year by Mr. Bruce Foote of the Geological Survey of India. Mr. Bruce Foote said that he found it being carted by a party of melon-growers from Chennoor, a village in the Cuddapah District 75 miles off. Enquiry showed that its value as a manure was but little recognized locally. From a quantitative analysis made of it for this department by the Chemical Examiner it would appear to be a most valuable manure, being particularly rich in ammonia. There are similar deposits of guano in caves under the Dolphin's Nose, a promontory on the north-east coast close to Vizagapatam, but the caves are practically inaccessible and the deposits are but little drawn upon.

58. (x) *Vegetable Rennet.*—Some experiments in continuation of those noticed in last year's report as having been made at the Saidápet Farm with *Withania coagulans* and other coagulants were made during the year and are noticed at paragraphs 102 to 104 of Mr. Benson's report. The most powerful coagulant was found to be the fresh juice of a local shrub known in Tamil as *Prayam* (*Epicarpurus Orientalis*), which curdled milk perfectly in 2½ hours, while milk treated with the powdered seeds of the *Withania coagulans* had in that time become only viscid.

It was found impossible to preserve, even with the aid of boro-glyceride, the cheese that was made from the curd through the ripening process.

59. (xi) *Bee-keeping.*—In the latter part of the year, 3 bee-hives and 12 copies of "The British Bee-keepers' Guide" were obtained from England. The hives with 3 copies of the guide were given to Mr. R. H. Morrison of Kótagiri and Dr. John Shortt and Mr. A. J. Nicholson of Yercaud, who have agreed to make experiments in bee-keeping and to report the result.

60. VI. *Cattle-breeding and Veterinary Establishments*—(1) *The Farm at Saidápet.*—Mr. Benson remarks at paragraph 24 of his report that the farm is "far too small for stock-breeding" and at paragraph 95 that it is "far too limited in area for really useful work to be done in breeding good sires for distribution." At paragraph 108 again, he writes that the same remark applies to sheep-breeding, and adds that "until breeding can be carried on on a larger scale the work of the department in distributing rams must remain limited and cramped and of little value; rams should be distributed not by tens or dozens per annum, but by hundreds, to do much good." In reference to these remarks, it may be observed that native owners must change their present practice and ideas before any material improvement in the cattle and sheep of the country can be looked for. So long as the young bulls and rams of inferior breeds are allowed, as they now are, to go uncastrated for years and to mix freely with the flocks and herds, so long must improvement be hindered or seriously retarded. It has been suggested that legislation should be resorted to. It might be possible to provide by law that all bulls, rams and stallions that were uncut after a certain age should be

taxed, but the question seems hardly one for legislation at all. The working of a legal enactment might easily become oppressive as it would undoubtedly be inquisitorial and expensive. It would certainly enforce selection, but legislation of this kind could hardly be attempted unless Government were prepared to spend largely on the provision of sires.

The end aimed at will, it is thought, be better attained by example and the gradual growth of opinion in its favour.

61. The herd of Aden cattle at the farm was considerably added to by fresh importations from Aden. These were somewhat disappointing as the bulls were all calves much too young for service. It will be impossible to distribute them to districts for another year or two. The flock of sheep was very healthy during the year.

62. Stock, chiefly bulls and rams, was distributed to several districts for breeding purposes.

63. (2) *Other Establishments.*—When the Government Cattle Farm at Hoonsoor in Mysore was about to be broken up, three small herds were formed and placed one at Pennagaram in the Salem uplands in charge of the Collector, another at Kodaikánal on the Palni Hills in Madura under the care of Mr. V. H. Levinge, late Collector of Madura, but now retired, and a third at Devacolum in charge of the Manager of the North Travancore Land Company. The herd at Pennagaram had not thriven, and on a report received during the year from Veterinary Surgeon Adams, who was deputed to inspect it, orders were issued for its sale and dispersion. The other herds are reported to be doing well.

64. (3) *Inspection of Cattle Disease and Veterinary Hospitals.*—The staff of the cattle disease inspection establishment consisted, at the end of the year, of the Inspector, a Deputy Inspector, six District Inspectors and nine Probationers. One District Inspector and one Probationer were dismissed during the year for insubordination and misconduct.

65. The hospital at Saidápet has continued to increase in usefulness and affords a most valuable training school for the probationers and students of the Agricultural College, at which the Inspector is one of the lecturers. It is very satisfactory to learn that some of the students have turned out very good practical men. One hundred and sixty cases were admitted for treatment during the year as against 51 last year, and 13,659 doses of medicine, packed according to an improved method, were distributed from the hospital as against the 3,751 of last year. The compound of the hospital appears to be infested with snakes, and a horse under treatment was bitten by a cobra and died.

Attached to the hospital is a garden in which are grown various plants useful either for fodder or for medicinal purposes.

66. Mr. Mills conducted a series of experiments in preventive inoculation for anthrax according to M. Pasteur's method. The results so far are satisfactory, and in Mr. Mills' opinion establish definitely the following conclusions :—

(1) That the anthracine can be imported from Paris with safety.
(2) That it readily becomes virulent if the tubes are exposed to tropical heat for any time.
(3) That the tubes must be kept in an ice chamber.
(4) That all animals can be with safety inoculated.
(5) That the inoculations can only be conducted by a specially trained person.
(6) That animals so inoculated enjoy perfect immunity, but for how long has not as yet been settled.
(7) That the anthracine is a *highly dangerous* fluid in the hands of any one ignorant of its properties.

67. The experiments conducted by Mr. Mills for the denaturalization of salt so as to make it available for agriculture and cattle without detriment to the public revenue were failures, and the late Chemical Examiner, Dr. Rogers, gave it as his opinion that the problem was insoluble by chemical or mechanical means. The real solution of it will probably be found in the increase of facilities for transport and reduced prices.

68. Mr. Mills notices a new drug "nitrite of sodium" which, from experiments made by him, promises to be of great therapeutic value in the treatment of *paraplegia.* It has been tried successfully in the treatment of neuralgia and allied diseases of the human subject.

69. The exact quantity of carbolic acid that could be administered to a buffalo has never been determined, but Mr. Mills' experience in the year under review shows that as much as an ounce can be safely given if it be properly diluted. The smallest dose of this drug is a dangerous and irritant poison if administered pure and undiluted.

70. Mr. Mills' experiments with aconite have led him to the conclusion that the doses laid down in the various pharmacopœias are erroneous and misleading. The official dose is put at from 30 to 50 minims for a horse and from 40 to 80 minims for cattle. In Mr. Mills' experience 3 oz. were administered to a pony within a few hours without the slightest effect. A further experiment went to show that the *herbivora* can take fifty times the quantity of this drug that the *omnivora* can.

71. Mr. Mills speaks again very highly of the antiseptic value of boro-glyceride, which he regards as almost a specific for unhealthy ulcers. Its price, however, Rs. 5 a pound, he considers to be prohibitive of its general use.

72. The *Rudrakshum* seed, three hundred doses of which were sent out in 1882-83, did not prove of much value in the treatment of rinderpest, for which it was supposed to be a specific.

73. Experiments were conducted, and are, under the orders of Government, being continued in animal cremation. A pamphlet on the subject written by Mr. Mills was widely distributed.

74. Another pamphlet entitled "Plain Hints on Cattle Diseases in India" was drawn up by Mr. Mills and was also very widely distributed. It is now being translated into Tamil under Mr. Mills' supervision. Orders were given for the translation and publication of it in the District Gazettes.

75. Mr. Mills paid 134 visits during the year to the various slaughter-houses in Madras. These visits which were entirely voluntary have, beyond doubt, resulted in good. It is satisfactory to know that the sanitary condition of the yards was generally good. Mr. Mills' efforts have had the effect of almost entirely stopping the slaughter of gravid animals, which was formerly frequent. His endeavours to prevent the spread of parasitic diseases by taking measures for the exclusion of dogs and the destruction at the slaughter-house of the cysts of the tape and other intestinal worms deserve all praise. All that is wanted is a chatty of boiling water. The butchers appear to have readily seconded Mr. Mills' efforts.

76. The statistics for the Presidency show that rinderpest and anthrax were the two most prevalent diseases during the year. The deaths from all diseases were 15,108, of which 7,824 were due to rinderpest and 5,871 to anthrax. The latter was, as usual, the more fatal of the two diseases, the deaths in the year being 64 per cent. of the attacks; in renderpest 46 per cent. of the animals attacked died.

77. Both diseases prevailed in every district of the Presidency, but not to the same extent nor so fatally as in last year. The mortality from all causes was for the corresponding period of this year rather more than half that during the seven months embraced by the figures of last year, and the percentage of deaths to attacks was only 41·94 as against the 59·36 of 1882-83. It was found necessary to enforce the provisions of the Madras Cattle Disease Act II of 1866 in the districts of Vizagapatam and Chingleput. Further enquiry has led Mr. Mills to conclude that his last year's estimate of the value of cattle, &c., was too low; and now, taking Rs. 25 as the average value per head of cattle and buffaloes and Rs. 2-12-0 for sheep and goats, and deducting one-fifth from the total number on account of young and undersized animals, he estimates the value of the cattle lost from disease during the year at Rs. 2,68,080. In addition to their ordinary duties of inspection, advice and treatment, the District Inspectors attend all local cattle fairs and make reports on the cattle exposed there for sale. Some of these reports, Mr. Mills says, are excellent.

78. VII. *Agricultural and Fiscal Statistics.*—A Conference, of which the Director was a member, was held at Calcutta in December 1883, for the consideration and revision of the statistical returns submitted by the Government of India to the Secretary of State. The Conference was of opinion that, among other things, the Agricultural Department of each province should endeavour to give the public an early forecast of the harvest prospects of any crop that had a special commercial importance. This matter had already received attention in this Presidency, and endeavours had been made in this department by means of monthly statements of sowings received from Collectors, and by suggestions as to the quantitative valuation of crops, to gauge the agricultural prospects of the year from month to month. The Board of Revenue were opposed to a quantitative valuation by the village officers of the outturn of the crops, and were of opinion that their valuation—they were quite of opinion that this estimate should, like the other agricultural statistics of the Presidency, have its origin in the village—should be qualitative only, being converted after check by the taluk staff into quantitative values according to fixed standards. This was the view taken by the Conference also.

79. The monthly returns of sowings have not hitherto been received with sufficient regularity nor sufficiently early to be of any practical use, while the initial standard estimates of outturn for different products that Collectors were asked to submit have been as yet received from only a few districts. It is now thought that too much was asked for, and recently the requirements of the department have been contracted and are now confined to quarterly statements of the sowings of certain products of special commercial interest and to the great food staples of the province, viz., rice, cholum, ragi and cumbu. It is hoped that this change may lead to the submission of the returns in time to make them really valuable.

80. For the conversion of the qualitative valuations of the outturn into quantitative values according to fixed standards, it is now further proposed not to await the estimates of Collectors, but, as a beginning, to adopt standards drawn up from the valuations of the Settlement Department for settled districts and to apply them generally throughout the Presidency. These values will be subject to correction on consideration of the results of experiments which Collectors have been asked to have made during each harvest season.

81. Suggestions were made during the year for the registration, on the method adopted in the North-Western Provinces, of road traffic in the vicinity of projected railway lines, and arrangements have been made since the close of the year for carrying the suggestions out. The registration is controlled by the Board of Revenue.

82. At the suggestion of the Director, the Board of Revenue directed the record of deaths from cattle disease in a form printed on the back of the birth and death registers that are submitted monthly from villages. In this way, very early information of the general condition of cattle throughout the Presidency is obtained for the Inspector. Special arrangements are made for the immediate report to him of any serious outbreak of disease.

83. VIII. *Trade and Trade Statistics.*—According to returns prepared in the office of the Board of Revenue, the total foreign or external trade of the Presidency, including exports to and imports from other Indian provinces and transactions in treasure and Government stores, amounted to Rs. 20,46,93,684, of which Rs. 12,21,30,223 represented the value of the export trade and Rs. 8,25,63,461 the value of the import trade. The chief articles of export are hides and skins, raw cotton, coffee, indigo, sugar, seeds, spices, grain and pulses, cotton piece-goods, oils, cocoanut and cocoanut kernel, coir yarn and rope, and tobacco; and of import, cotton piece-goods, cotton twist and yarn, grain and pulses, metals, liquors, apparel, timber and wood, and railway materials. The interportal trade of the presidency amounted Rs. 3,85,47,712.

84. The inland trade with other provinces is at present only registered for foreign states. Its value was Rs. 7,08,46,458, of which Rs. 4,12,91,337 represented the value of the exports and Rs. 2,95,55,121 the value of the imports. The chief articles of import were raw cotton, coffee and sugar; and of export, seeds, Indian piece-goods and spices.

The total value of the trade of the Presidency, so far as it was registered, therefore, was in 1883-84 Rs. 31,40,87,854.

85. After the close of the Statistical Conference at Calcutta, the conclusions of which have been since circulated to Local Governments for an expression of opinion, the Director, with the permission of Government, proceeded on a tour in the North-Western Provinces and Central India, in the course of which he visited the Government Farm at Cawnpore, the Government Gardens at Lucknow and the Mayo College at Ajmere. The plan and principles of the last-named institution, modified as may be necessary, seem to be admirably adapted to the conditions of a Rajkumar College in this Presidency for wards of Court and the sons of the greater landholders. The plan of the institution is a central hall with annexed class rooms, the pupils being housed in separate dwellings built one for each state in the park-like grounds of the college, of various sizes and various designs—miniature copies, perhaps, of the palaces at the capitals of the chiefs.

I have the honor to be,

Sir,

Your most obedient servant,

W. WILSON,

Director of Revenue Settlement and Agriculture.

THE ANNUAL REPORT

OF THE

AGRICULTURAL REPORTER TO THE GOVERNMENT OF MADRAS, 1883-84.

I have the honor to submit the following report on the work conducted under the direction and supervision of the Agricultural Reporter and Superintendent of Government Farms during the year 1883-84. In doing this, I labor under considerable disadvantages, for I had little to do with the practical work of the department during the year, having been almost exclusively employed in the School of Agriculture, and I only received charge of the work from Mr. Robertson on the 1st April last, he having conducted it throughout the year.

2. *Agricultural Education* occupied a large portion of the time of the officers of the department during the year; but as the School of Agriculture has been separated from it, and as a separate report will be submitted by the Principal, it is not necessary to refer to it further in this. Three classes were under instruction during the year, and considerable difficulty was experienced in affording them instruction in practical agriculture; and, as it appears that this department is to undertake this portion of the training in future, as distinguished from the collegiate course, it will be well to remember that practical instruction cannot be satisfactorily given except to small classes.

GENERAL OPERATIONS.

I. Agricultural Tours.

3. No tours were made by the Agricultural Reporter during the year, his duties as Principal of the School of Agriculture not allowing of his being absent from head-quarters for long. The change in the charge of the Saidápet Farm also necessitated his remaining there.

4. Mr. Benson proceeded on a tour in the Godávari and Kistna deltas, when relieved of his work in the School of Agriculture in June, under instructions from the Director of Agriculture, to report on the following points :—

(1) A parasitic plant (bôdu) attacking tobacco.
(2) A disease (kodu) attacking paddy.
(3) The feasibility of some experiments in treating choudu land by trenching and drainage.
(4) The growth of sugar-cane in the Godávari District.
(5) The agricultural systems pursued generally.

The tour lasted from June 27th to August 23rd, but it was impossible to make proper arrangements for the latter part of it owing to uncertainties as to the time at which a return to Madras would be necessary. Special reports were submitted regarding the tobacco parasite and the suggested experiments with choudu land in the Kistna, which have not been published, and a general report referring to the other points was submitted on September 8th and has since been published. The agricultural system of the deltaic tracts, which were almost exclusively referred to, was found to present few, if any, new aspects, and paddy, the chief and almost exclusive

crop of the tracts, was noticed as being badly cultivated and grown under a very uninteresting system of cultivation, the ryots doing little and nature a great deal for the crop.

A good deal of information regarding the cultivation of sugar-cane and the manufacture of sugar therefrom was collected, and an estimate was given of the cost of these operations, which, like all such estimates based on hearsay evidence, collected during a short and passing visit, was characterised as not very trustworthy.

No explanation as to the cause of the "Kodu" was determined, but attention was drawn to several other plant diseases prevalent in the deltas.

5. Mr. Benson was also deputed to visit the North Arcot Agricultural Society's Show at Chittoor in February, where he assisted as a judge of exhibits and in carrying out a ploughing exhibition and match and also delivered a public lecture on "Ploughs and Ploughing."

II. Exhibitions.

6. No Government Exhibition was held in the Presidency during the year, but a scheme was adopted for holding them regularly at different places in the future.

7. The annual ploughing match, which has been rather an exhibition of the working of *real* versus native ploughs, was held on the 26th January and assumed a new aspect, for competitors with real ploughs appeared altogether independently of the Saidápet Farm. These annual matches were instituted for the encouragement of good work amongst the farm laborers, but have now assumed a public character, and it has been suggested that they should be placed on a different footing and controlled by a Committee. Advantage was taken by Messrs. Massey and Messrs. Oakes of the occasion, which drew a large number of people together, to exhibit collections of implements suited to the Indian requirements.

It has been suggested that the ploughing exhibitions should be extended throughout the country, and advantage will be taken of the tours of the Agricultural Reporter to hold such exhibitions at suitable times in various places.

8. A considerable collection of exhibits, typical of the agricultural implements in use in the Presidency, was made and forwarded to the Calcutta Exhibition, where they appear to have met with an unfortunate fate, as no one was at hand to put the articles, which had been taken to pieces for convenience of packing and transport, together again, and each part appeared separately in the catalogue.*

9. A small collection of ploughs and other implements likely to be of value to the native cultivator and of some of the more interesting new and useful products brought under notice by the department was sent to the Chittoor Exhibition. Ploughmen were also sent there to show the ploughs at work in the field, and this excited a great deal of attention and comment among a large assembly of ryots present. No difficulties were experienced in finding cattle capable of drawing the ploughs; in fact amongst the extremely numerous working cattle exhibited there were few pairs unsuited for medium-sized ploughs; and, although the cattle were untrained to work with real ploughs, some most creditable work was turned out. Another similar collection was also made and despatched to the Travancore Exhibition, which has been held since the close of the official year. There also the collection attracted a good deal of attention, and the only matter for regret is that some skilled ploughmen were not sent down with the ploughs to show how they should be handled.

The Saidápet Farm also exhibited a collection of produce, implements, dairy utensils, &c., at the Madras Agri-Horticultural Society's Show in February.

III. Introduction and Distribution of Implements.

10. This work has been chiefly confined to sending out the Swedish ploughs for exhibition in the districts as mentioned in paragraph 5 of the last annual report. No reports of the working of the ploughs therein referred to have been received in this

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* The collection was however awarded a first class certificate and Silver Medal.

office, but a general report on the results of the distribution has been prepared in the Director's office and submitted to Government. It is to be regretted that it is not combined with this so as to show the complete work of the department during the year.

The following statement shows how the ploughs referred to last year have been disposed of:—

District.	Number sent out.	Number returned to Saidápet.	Number retained for Exhibition.	Number sold.		
				Direct.	By Collectors.	Total.
Ganjam	10	6	4	..	..	..
Vizagapatam	10	3	7	..	..	..
Godávari	10	7	2	..	1	1
Kistna	11	7	2*	9	2	11
Nellore	9	9	..	..	..	..
Cuddapah	13	..	13	..	..	..
Anantapur	7	7	..	..	..	..
Bellary	8	..	8	58	..	58
Kurnool	8	3	..	31	5	36
Madras	..	..	..	12	..	12
Chingleput	8	..	6	4	2	6
North Arcot	16	16	..	..	..	..
South Arcot	8	8	..	1	..	1
Tanjore	9	6	2	..	1	1
Trichinopoly	5	3	..	..	2	2
Madura	6	..	5	10	1	11
Tinnevelly	9	5	..	2	4	6
Coimbatore	10	6	3	..	1	1
Nílgiris	3	2	..	..	1	1
Salem	10	..	8	8	2	10
South Canara	5	3	2	..	..	..
Malabar	8	..	..	..	8	8
Other places	..	..	..	31	..	31
On hand	..	..	..	..	..	2
Total ..	183	91	62	166	30	198

11. The general experience of the Collectors as reported was that the ploughs were too heavy for the ordinary country cattle, but it may be doubted whether this opinion is based on a full and complete trial of the ploughs. In many cases it is to be feared that the ploughs were treated as museum specimens and locked away in rooms of the cutcherries of the Tahsildars to whom they were sent, and, either from want of time, interest, or knowledge, never fairly experimented with, if at all. The plough is probably too heavy for the cattle of some districts, but in many this is not so; for instance, in the Kistna District the plough was thought to be too heavy, whereas the cattle in at least a large portion of the district are as large and fine as in any part of the presidency, and it was found at the Chittoor Exhibition that the far smaller cattle available there were easily able to work the ploughs when properly managed. The truth of the matter is that the exhibition and trial of new implements, &c., must always, if they are to be properly conducted, be carried through by experienced hands. As yet the department has no agency in the districts capable of conducting such trials, and, in the face of the great importance of giving to the ryots efficient ploughs and the incontrovertible superiority of those which have been recommended by the department over the native implement, it is most desirable that such an agency should be provided. It easily can be.

12. Considerable success, it will be noticed, was attained in the Bellary District mainly through the exertions of the Head Assistant Collector, Mr. Russell, and a much larger number of ploughs would probably have been sold there could the demand

* One was broken in transit.

which sprung up have been met immediately. The ploughs, however, could not be got back from the districts where they were not appreciated sufficiently rapidly to meet it. The cattle in the western portion of the Bellary District are not peculiarly fine, and much better are to be found in the eastern portion of the district and in Cuddapah, as well as probably in Kurnool.

13. *Trained ploughmen* were sent out from the Saidápet Farm to some of the districts during the year to enable the district officers to show the ploughs sent to them at work. In the following statement details are given regarding this work:—

District to which sent.	Number of Men sent.	Time absent.	
		Started.	Returned.
Ganjam	1	17th July 1883.	18th November 1883.
Kistna	2	8th January ,,	18th June ,,
Kurnool	2	7th June ,,	1st September ,,
Cuddapah	2	23rd January ,,	One 1st Feb. ,, ,, 3rd April ,,
Anantapur	1	30th May ,,	22nd June ,,
North Arcot	1	7th February ,,	6th June ,,
Salem	2	30th January ,,	One 8th Feb. ,, ,, 16th April ,,
Coimbatore	1 1	3rd July ,, 16th August ,,	21st July ,, 1st November ,,
South Canara	1	16th May ,,	4th August ,,
Madura	1	26th June ,,	11th July ,,
Tinnevelly	1 1	8th May ,, 1st September ,,	28th June ,, 17th November ,,

No reports have been received as to the work these men did in the districts. A large proportion of the men returned to Saidápet in bad health.

14. A number of men were sent down to the Saidápet Farm from several districts for training in ploughing. The following statement shows whence they came and what they did :—

District from which sent.	Number of Men sent.	Time spent at Saidapet.		Remarks.
		Arrived.	Left.	
Godávari	4	10th September 1883.	6th November 1883.	Fairly efficient ploughmen.
Salem	2	25th ,, ,,	5th ,, ,,	Do.
North Arcot	2	17th ,, ,,	5th ,, ,,	Do.
Trichinopoly	2	6th October ,,	One 5th November 1883 ,, 13th ,, ,,	Do. Do.

The men from the first three districts were sent by the Collectors and were paid at the cost of the department; the men from Trichinopoly were sent by a Mirasidar and trained at his expense. It is much better that men should be sent down to learn ploughing than that men should be sent up to the districts from Saidápet.

15. *Blacksmiths* were sent from Ganjam, North Arcot, and Bellary to learn how to make and repair ploughs in the farm workshops. This is a very useful thing, as the men soon see that there is no real difficulty in the matter. These men were paid from the Village Service Funds of the districts.

16. In order to show all the work done by the department in this respect, the following table of the number and description of the implements sold from the Saidápet Farm during the year is given here. A considerable number of the improved country ploughs were purchased and sold by the farm; some were made in the farm workshops. This table does not show the number of improved ploughs actually placed in

the Presidency during the year, as Messrs. Massey and Co. and Messrs. Oakes and Co. have entered on the manufacture and sale of these implements :—

Districts.	Improved Country Ploughs.	Other Ploughs of sorts.	Subsoil Ploughs.	Drag Harrows.	Barrow Drills.	Bamboo Drills.	Bullock Hoes.	Cake Crushers.	Dressing Machines.	Tools of Sorts.
Ganjam	1	..	..	..	..	..	..	..	..	..
Godávari	..	..	..	..	1	..	..	..	..	..
Cuddapah	9	..	..	..	..	..	..	..	..	..
Bellary	..	2	..	..	..	..	..	..	..	..
Madras	11	4	..	..	..	..	..	..	..	..
Chingleput	14	..	..	..	..	..	..	..	..	..
North Arcot	26	..	..	..	..	..	..	..	..	..
South Arcot	19	..	..	..	..	1	..	..	..	..
Tanjore	85	..	..	1	..	1	..	1	3	2
Trichinopoly	3	3	..	..	..	..	..	1	..	18
Madura	3	1	2	..	..	1	..	..	..	1
Tinnevelly	1	..	..	1	..	..	..	..	..	..
Coimbatore	..	..	..	..	..	1	..	..	..	..
Nílgiris	2	1	..	..	..	1	..	..	..	..
Salem	4	..	..	1	..	..	..	..	..	1
Other places	17	5	1	..	..	..	1	1	..	4
Total ..	195	16	3	3	1	5	1	3	3	26

IV. Seed Distribution and Experiments.

17. The following table shows the amount of seeds, &c., distributed gratis by the department during the year ; very few reports of results have yet been received, and so no further reference is made to them here, but they will be reported on separately.

Districts.	Wheat.	Barley.	Maize.	Sorghum Saccharatum.	Planter's Friend.	Reana Luxurians.	Amber Sugar-cane.	Guinea Grass Roots.	Sixty Days' Paddy.	Broom Millet.	New Orleans Cotton.	Castor Oil.	Indigo.	Divi-divi.	Casuarina.	Hemp.	Manilla Hemp Plants.	Tobacco.	Corkapilly.
	LB.	LB.	LB.	LB.	LB.	LB.	LB.	BUNDLES.	LB.	LB.	LB.	LB.	LB.	LB.	OZ.	LB.	NO.	LB. OZ.	LB.
Ganjam	101	..	49	..	13	..	..	..	..	..	202	..	..	..	..	..	..	10 2	..
Vizagapatam ..	..	..	17	..	12	..	..	..	..	12	3	..	..	..	..	..	..	0 ¼	..
Godávari	6½	2	98	70	15	..	..	..	..	30	49	..	..	1	..	..	..	4 4	..
Kistna	..	..	34	82	..	15	..	..	..	..	139	1	..	1	..	..	..	5 8	..
Nellore	..	..	..	..	..	..	..	..	..	..	63	..	..	..	..	..	..	0 12	..
Cuddapah	..	..	14¼	..	..	..	..	..	..	20	25	..	..	..	..	..	50	..	..
Bellary	150	400	40	..	5	5	..	..	..	20	51	..	..	2	..	..	..	1 0	..
Anantapur	..	..	6	..	3	..	..	..	..	3	5	..	..	..	4	..	..	7 8	50
Kurnool	..	..	20	..	..	..	..	..	..	..	525	..	..	..	..	..	4	..	..
Madras	..	..	9¼	5	..	..	½	..	..	..	5	..	..	..	..	..	..	0 ½	20
Chingleput	..	..	258	198½	4	..	..	2	..	4	98	142½	..	..	..	..	..	1 6	20
North Arcot	..	..	30	..	..	8	..	1	..	..	..	..	..	..	..	..	..	..	..
South Arcot	6	..	..	..	..	..	..	..	..	..	22	..	..	..	..	..	30	..	..
Tanjore	10	..	2	..	..	1	..	1	..	10	36	..	3	..	4	..	12	1 9	7
Trichinopoly ..	..	..	..	..	1½	20	..	..	..	10	..	..	..	..	..	..	..	2 0	..
Madura	210	150	..	..	..	1	..	..	..	..	55	..	..	1	..	..	30	..	..
Tinnevelly	..	..	4	2	2	..	..	1	..	..	204	..	..	..	..	..	..	2 0	5
Coimbatore	48	..	50	2	..	20	1	..	..	..	36	..	..	1	1	..	75	..	5
Nílgiris	975	752	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Salem	170	110	50½	50½	75½	30	..	2	..	25	68	..	..	..	..	..	..	0 4	..
South Canara ..	..	..	5	..	..	5	..	..	..	..	12	..	..	..	..	..	..	..	..
Malabar	..	..	8	4	..	..	..	..	..	3	39	..	..	..	..	1	..	0 9¾	..
Outside the Presidency	..	..	10	5	7½	..	½	2	8¼	..	38	..	6	½	4	¼	..	1 2	1
Total ..	1,676½	1,414	710	419	138½	105	2	9	8¼	137	1,675	143½	9	6½	13	1¼	201	38 1½	108

V. Improvement and Distribution of Stock.

18. The importation of Aden stock, the sending out of young bulls as breeding sires, and the distribution of rams for the same purpose will be found referred to in the portion of this report referring to the Saidápet Farm. The present operations of the department in this respect are far too limited for any appreciable result to be hoped for within any calculable period (see Farm Report).

VI. Correspondence, Reports, &c.

19. During the year special reports on the following subjects were drawn up and submitted by the Agricultural Reporter :—

Wheat mildew and rust.
Sericulture.
Cheese-making.
Amber sugar-cane—growth of, and manufacture of jaggery.
Hybridization of cotton.
Agricultural Exhibition, Madras.
Use of windmills for raising water.
Mr. Fuller's Agricultural Primer.
System of ensilage.
Ploughs for the ryot—several reports.
Castor beans—extraction of oil.
Selection of seed.
Use of the flail, &c.
Growth of Planter's Friend and Broom Corn.
Ploughing match.
Sugar mill trials at Calcutta.
Growth of wheat at Saidápet, &c., &c.

Some of these were published in the form of Government Proceedings, but in that form they are not available to any considerable extent to the general public, and, as with this report, publication in the foolscap form is nearly fatal to circulation and utility. That such reports as this should be looked upon rather as a means of circulat ing information to the masses than as prepared to record simply the operations of Government can scarcely be gainsaid. If they are so regarded, every endeavour should be made to extend their circulation and to bring them out as early after they are ready as possible. The report for the year 1882-83 has not yet been distributed.

20. The correspondence with the native public, which in the year 1882 was reported as showing signs of rapid extension, has almost collapsed. The applications received during the year for information were comparatively few and meagre. One reason that can be suggested for this is the very natural suspicion with which the combination of the work of bringing about agricultural improvements and that of fixing the land-rent may be viewed by the people, who as yet do not appreciate the real aims of Government in the former direction. Another possible reason is the delay and uncertainty experienced in distribution of the reports of the department. Notwithstanding this, the number of letters issued showed no diminution, nor did their importance, but the correspondence is now chiefly with the Director.

21. Mr. Benson was engaged, in the leisure he was able to afford from his duties in the Agricultural College, on the preparation of the "Saidapet Farm Records," a compilation regarding the work done on the farm in years past; but, owing to the small clerical staff of the office, he was not able to prepare it for the press. He also prepared an illustrated catalogue of agricultural implements and machines found useful at Saidápet and considered suitable for introduction in Southern India.

22. Notwithstanding the heavy pressure on it referred to in all recent annual reports, at the end of the year the clerical staff was reduced by 30 per cent.

23. The Agricultural Reporter was appointed Editor of the Agricultural Sheets of the District Gazettes at the end of the year, and will perform the duties as far as the uncertainty of his other work allows, in the future.

DIRECT FARMING OPERATIONS.

24. The only work of this nature attempted during the year was the management of the Saidápet Experimental Farm, on which operations were directed chiefly in the interests of the students of the Agricultural College, and of the Botanical and trial grounds, now transferred to the Educational Department, which afforded a most convenient place for trying experiments on a small scale, rearing valuable trees, &c. The Agricultural College having now been separated from the department, the management of the farm will need reconsideration, especially with reference to two points, viz., the arrangements to be made for the training of the students in the practical work of farming operations, and whether the department is to carry on on the farm similar work to that done during the last few years in the botanical garden, where it can be always more closely looked after and would be always under the direct supervision of the Principal of the College. It is also questionable whether the conditions of the farm render it suitable for experimental work, except of an elementary character, and to a limited degree, whilst for stock-breeding it is far too small as will be seen by a perusal of this report.

25. As the Agricultural Reporter will in future be on tour for a considerable part of the year, the farm will be deprived of the direct supervision of a European officer, without which it has not been for 15 years. The results obtained on a farm must always depend chiefly on the officer in immediate charge.

26. *The Farm Estate.*—The area of the farm estate as it stood on 31st March 1884, excluding the land near the toll-bar and also the sites of the slaughter-house, the botanical garden, the students' cottages, the Agricultural College, the Roshumbaugh village site, and the Police lines, was about 225 acres. This area is made up as follows :—

	ACRES.
Roads, drains, and channels	19¾
Farm yard and buildings	8½
Waste land on the river border and the ravine	19¾
Fruit and fuel plantations	99¼
Permanent grass land	7¼
Arable land	70½
Total ...	225

A piece of land near the toll-bar, which was made over to the Commissariat Department in 1878, was retransferred to the farm during the year. The land was cleared and partially fenced, and it is intended to keep it as a site for future agricultural exhibitions.

SEASON.

27. *The first period* (April and May) was quite rainless, the average fall in the previous 10 years being 4·15 inches. It was also preceded by a rainless period of nearly 4 months, only ·03 inches having fallen on the 1st December. There was thus continuous drought from the 2nd December 1882 till the 4th June 1883, or for 184 days—a drought prolonged beyond the experience of the previous 10 years—the average rainfall during the corresponding period being 11·03 inches, chiefly registered however in December.

28. *The second period* (June to September).—The first break of the dry season above referred to occurred on the 4th June after a short period of very great heat. The rainfall during this period was 18·40 inches, and the wet days 44, the average of the previous 10 years being 15·32 inches falling on 33·4 wet days. During June and and July the rainfall was nearly three times the average, and the weather during the latter part of June and the month of July was favorable for the growth of fodder crops. In August and September, though the number of wet days was about the average, the rainfall was only about half the usual amount. The last week of August was very dry, only ·17 inches having fallen on 2 wet days; the average for the corresponding period of the previous 10 years being 1·31 inches on 2·3 wet days. The drought, which commenced on the 26th August, continued till the end of September; and

although 2·10 inches of rain fell on the last day of the month, it was the driest experienced during the last 15 years, and this portion of the season was thus even more unfavorable than that of the famine year of 1876. In September of that year 2·10 inches of rain fell on 4 days, whereas in September last (excluding the 30th) only ·38 inches fell on 4 days. During the first fortnight of September last there was only ·05 inches of rainfall with 2 wet days, whereas in the corresponding period of the famine year 1·82 inches fell on 3 days. The average rainfall of September during the last 13 years is 6·03 inches, or nearly 16 times as much as fell in September last, the last day excepted. The following is a statement comparing the weekly rainfall of the latter part of August and the month of September last with the weekly averages of the previous 13 years and the fall in the same period of the years 1876 and 1879, which were remarkable for dry Septembers :—

Week.	Average of 13 Years.		1883.		1876.		1879.		Remarks.
	Rain-fall.	Wet Days.	Rain-fall.	Wet Days.	Rain fall.	Wet Days.	Rain-fall.	Wet Days.	
21st	·72	1·77	2·10	4	·36	2	·74	4	Ends August 25th.
22nd	1·42	2·39	·20	3	2·71	3	4·00	6	
23rd	1·79	2·31	·02	1	1·81	2	·70	2	
24th	1·42	2·15	..	..	·01	1	·50	1	
25th	1·55	1·39	·01	1	..	..	..	..	
26th	1·02	1·31	·32	1	·28	1	..	..	Ends September 29th.
21st to 26th	7·92	11·32	2·65	10	5·17	9	5·94	13	
22nd to 26th	7·20	9·55	·55	6	4·81	7	5·20	9	

The preparation of land for the cold-weather crops is generally effected on the farm towards the end of August and in September; but last year, owing to the unfavorable nature of the weather, tillage operations could not be commenced till October.

29. *The third period* (October to December).—The total rainfall registered in this period was 45·34 inches on 39 wet days. The average of the previous 10 years was 27·59 inches on 29·4 wet days. The total fall in October was 19·79 inches with 20 wet days against an average of 10·08 inches with 11·5 wet days. The amount registered in falls of above 1 inch in October was 16·03 inches on 8 days, whereas the average in the month for the previous 10 years was 7·8 inches with 4 wet days. The early part of October was favorable for the tillage of dry lands, but the crops which were then sown were very much damaged by the incessant and heavy rains which followed. These rains did injury in several ways—(1) by mechanically beating down the seedlings, (2) by saturating and washing the soil, (3) by rendering the soil compact at the surface, and (4) by preventing the access of heat. While September was the driest, last October was one of the wettest months experienced during the last 14 years. Excepting 1875, it was in fact the wettest month during that period. Though the rainfall in October 1875 was as much as 21·91 inches, there was not apparently so much injury done to the crops, as September in that year was also a very wet month (*vide* report of the farm for 1875-76); and there was not only no sudden change from dry to wet weather, but the crops of that year were in an advanced stage of growth in October and were therefore capable of withstanding the heavy rains. The weather of 1883-84, it will be seen, is somewhat similar to that of 1879-80 so far as September and October are concerned. But the August of that year "was everything that could be wished for preparing the land for cold-weather crops; the exceedingly large amount of rain—7·24 inches—which fell during this month was distributed over 15 wet days, but was nearly all precipitated during the latter half of the month. The weather continued to be favorable for the preparation of the land and for sowing cold-weather crops during the first part of September;" and the crops it appears had in that year made much progress in growth before the heavy rains of October. The tillage of dry lands in the second fortnight of October was much impeded by the heavy rains.

30. The rainfall in November was very peculiar. It was much less than the fall in October, whereas the fall in November is usually greater than in October. In the

latter half of November there was 5·40 inches of rain which fell on 3 days, whereas the average for the corresponding period in the previous 10 years was 6·86 inches on 6 wet days. The amount of rain which fell in the first half of November last was to the amount which fell in the second half as 154 : 100, whereas the average proportion is as 93 : 100. The wet days in the first half of November last were to those in the second half as 9 : 3, whereas the average ratio is almost 1 : 1. The rainfall in December was nearly three times as much as the average of the same month for the previous 10 years, and the amount precipitated in falls of one inch and over in the month was 11·83 inches against an average of 1·10 inches. Between the last wet day of November and the first wet day of December, there was an interval of 20 days' drought, whereas the average dry interval at this period is only about 6 days. Except in 1876, the dry interval has not been more than 10 days in any of the previous 10 years.

31. *Fourth period* (January to March).—During January the fall was about five times as much as the average, the rains of the north-east monsoon being greatly prolonged, but the last two months of the year were quite rainless and were thus normal in their character, except that the heavy morning fogs were prolonged till late in March.

32. *Summary.*—It will be observed that—

(1) The drought in the early part of the year was unusually prolonged, but was followed by favorable weather in June and July.
(2) There was an unusual drought during the latter part of August and the month of September followed by the abnormally heavy rains of October and the early part of November.
(3) The spell of dry weather, which commenced on the 21st November, was very long and was followed by the very heavy rains as late as after the 11th December.

In short the weather of the year under report was on the whole very unfavorable; consequently the crops which were sown with the early rains of the north-east monsoon were very much stunted in their growth and attacked with rust. The maize flowered when not more than 2 feet high, the cobs were scarcely one-fourth of the normal size, and the grain on the cobs was no bigger than cholum; and though every effort was made to stimulate the growth of these crops, there was no material improvement, and they were therefore cut for fodder, except a small portion in No. 10 west which was better than the rest. The cotton crops likewise were stunted and attacked with rust. Similar results were observable in Planter's friend, broom millet, yellow cholum, &c., but it is remarkable that the raggy crops, though pale and unhealthy during the rains, very soon recovered and gave a satisfactory outturn. So also did the paddy crops.

33. The supply of water from the Mylapore tank lasted from the middle of October to the middle of March. The plug of the new sluice was furnished with a rubber cover by the Public Works Department, but still it did not prevent leakage, and consequently there was no need of raising the plug till the middle of December. Four of the water-lifts received a supply from river channels, and this was unexhausted during the year, and the well in No. 11, where a double mhote is set up, also yields an unfailing supply. Of the smaller wells where picottahs are set up, four contain a good supply and four a supply which is soon exhausted.

34. *Attacks of insects and fungoid disease* were extensive. The paddy crops were all attacked by what is called in Tamil "Ura poochee." The grubs being within the stem of the plant, it is impossible to get rid of them by any mechanical means; but, after drying the fields and dressing the crops with castor or cocoanut cakes to invigorate the plants, they recovered.

35. Rust affected the crops very extensively. It attacked all the sorghum crops, viz., yellow cholum, white cholum, Planter's friend, *Sorghum saccharatum*, amber sugar-cane, broom millet, and also *Reana luxurians* and maize. It first appeared in field No. 16, where the Planter's friend crop was remarkably pale and unhealthy at about the end of January, when the daily range of temperature was very great, and it is a well-known fact that an alternation of high temperature during the day

and low temperature during the night is a predisposing cause of fungoid diseases. Smut was only observed in the ears of the *Andropogon halipense.* Its absence from the farm crops is to be attributed chiefly to the fact that the seeds are invariably dressed with sulphate of copper. As rust does not propagate itself from germs adhering to the seed, sulphate of copper does not serve to destroy it. The various sorghums are often covered with white incrustations, and this was very marked during the year. On examining the mealy substance under the microscope, it was found to be a group of fungi. Perhaps this is a form of mildew which is supposed to be an early stage of rust.

Cropping.

36. At the beginning of the year under report there were 85¾ acres of arable land under cultivation, of which 15¼ acres were planted during the year with casuarina, divi-divi, and cocoanut trees, so that the extent of the arable land at the end of the year was 70½ acres. The following table summarises the cropping of the year :—

—	Arable Area.	Crop standing.		First Crop harvested.	Second Crop harvested.	Third Crop harvested.
		Grass.	Other Crops.			
	ACRES.	ACRES.	ACRES.	ACRES.	ACRES.	ACRES.
1st April 1883	85¾	13	27·20	..	..	..
During the year	..	..	..	90·65	23·02	6·73
31st March 1884	70½	10·50	27·04	..	..	..

37. *Fodder Crops.*—The total area of these crops raised (including second and third crops) was 94·63 acres, of which 12 acres had been sown before the commencement of the year; there were 13 acres under guinea grass, of which 5 acres have been planted out with casuarina and divi-divi trees amongst the grass, and about 2½ acres of new land were planted during the year, so that 10½ acres of the grass were standing at the close of the year. About 12½ acres of other fodder crops were also standing at the close of the year. The area of the permanent grass land which is used for grazing purposes is 7¼ acres. Guinea grass was planted during the year extensively between the rows of casuarina and divi-divi trees, the total area occupied by the guinea grass itself in the plantations now being 8·35 acres.

The total outturn from the 82·18 acres of fodder crop harvested was 304,119 lb., or an average per acre of 3,700 lb. against 2,970 lb. per acre obtained last year and 3,307 lb. obtained in the year before. Besides this, a considerable amount of grazing was obtained from some of the land, and several crops were nearly ready to cut again on April 1st.

Details will be found in the table in Appendix II-A.

38. In the early part of the year, the live-stock were numerous and the stock of fodder was small. In the latter part of the year the stock was still further augmented by the large importation from Aden. It was, therefore, necessary to sow fodder crops exclusively in the hot weather, and it was intended to raise corn and other crops chiefly in the cold weather, but, on account of the abnormal character of the season, several corn crops had to be cut for fodder. Every endeavour likewise had to be made to increase the stock of fodder, even to gathering hariali grass wherever it was available on the farm. About 3 tons of hariali hay was thus collected and made.

The most satisfactory outturn of fodder is that of white car paddy from Plot D of the river flats. In 67 days it yielded 10,718 lb. of green fodder per acre. The yield per acre per day of growth is thus about 145 lb. Next comes the shamay crop in No. 37, which yielded, without any irrigation or manure, about 12,274 lb. of fodder in 107 days, or about 115 lb. of fodder per acre per day of growth. The white cholum in No. 4-A yielded as a first cutting in 108 days 9,175 lb. of fodder, or about 85 lb. per day of growth per acre. The soil had been dressed with 18 cart-loads of box manure per acre and the crop was irrigated twice. The horse-gram crop of field No. 15 is very satisfactory, for it yielded in 52 days 4,432 lb. of green fodder per acre, or 85 lb. per day of growth without any manure or irrigation.

The following table summarises these and some other figures :—

Field.	Crop.	Yield per Acre.	Days' Growth.	Growth per Acre per Day.
		LB.		LB.
No. 15 ...	Horse-gram ...	4,432	52	85
No. 4-A ..	White cholum ...	9,175	108	85
„ 37 ...	Shamay ...	12,274	107	114
„ 32 ...	Cholum ...	9,608	83	116
River Flats ...	Paddy ...	10,718	67	159

39. The seed of the red cholum crop sown in No. 11 was received from Aden with the imported stock, having been shipped for their food during their journey. The seed was very plump and apparently half as large again as the ordinary cholum of this presidency, and the straw of it, which was used as fodder for the stock, was at least 8 feet long. The seed was sown for a fodder crop in No. 11 on the 13th February, or very late in the season, and apparently the change of climate was too great. The plants flowered within 40 days after sowing when scarcely 3 feet high and were very slender.

40. The following statement shows the outturn of some experiments with grasses raised in the Botanical garden during the year, or plots measuring 80 square yards each :—

Kind of Grass.	Yield during the Year.	Yield per Acre.
	LB.	LB.
Guinea grass	617	37,020
Andropogon halipense	734	44,040
Panicum Browni	422	25,320
Lemon grass	646	38,760

The Panicum Browni was allowed to mature its seed and appears to be a promising introduction.

41. Seeds of some varieties of grasses, &c., were received from up-country and sown in the Botanical garden after the north-east monsoon rains had ceased.

The following varieties germinated and grew :—

Vernacular Name.	Where from received.	Remarks.
Panippillu	Tanjore ...	Grew 3′ high.
Keelpillu	Do. ...	Coarse and short.
Thengainarpillu ...	Do. ...	Grew 9″ high.
Mathangaipillu ...	South Arcot.	Grass succulent and 1′ high, flowered and ripened its seed. This is what is generally called the finger grass and closely resembles raggy.
Kooloppaipillu ...	Do. ...	Grew 9″ high.
Kolakattaipillu ...	Coimbatore ...	Grew about 15″ high. Ripened its seed.
Sadimigaddi ...	Bellary ...	Grew 1′ high.
Kugasigahullu ...	Do. ...	Grew $1\frac{1}{4}$′ high.
Bommidayalugaddi ...	Kistna ...	This is not a grass. Flowered and gave 1 ounce of seed.
Ottoopillu ...	Tanjore ...	This is not a grass.

42. *Salt bush* (*Atriplex nummularia*).—A small quantity of the seed of this plant was obtained from Australia and sown in the Botanical garden. The plants have grown fairly and are now 9″ high and have spread to about 4″ in diameter. From 116 plants raised from seed sown in October 7 oz. of seed have been obtained.

Obione Konigü—.Tamil Avalkeerai.—This plant was found growing on the salt-beds near Ennore and may be of use for growth as a fodder plant on similar land elsewhere. No seed has yet been obtained.

43. *Horse-gram.*—It is a practice on the farm to sow this crop for fodder, or use as a green manure, on paddy land immediately after reaping the cold weather paddy crops, if a second crop of paddy cannot be raised. The small quantity of moisture present in the land at the time of harvest is generally enough to start the crops, which are found to give a fair outturn of fodder, though there may be no rain whatever during their growth. The advantage of this system is that the land is made use of and kept under tillage during the dry season. The following statement shows the extent to which horse-gram was raised in the early part of the year and the outturn :—

Field.	Area.	Date of Sowing.	Date of Harvest.	Duration of Growth.	Outturn.
	ACRES.			DAYS.	LB.
22	1·63	3rd March 1883.	4th May 1883.	63	1,835
28-C	·99	10th March 1883.	22nd May 1883.	74	920
30-A	2·05	28th February 1883.	14th May 1883.	76	3,685
34-B	·77	28th February 1883.	5th May 1883.	76	730
35-B	·61	26th February 1883.	8th May 1883.	72	816
36	2·94	6th March 1883.	2nd June 1838.	89	3,656
37	·45	7th March 1883.	26th May 1883.	81	1,520
Total ..	9·44				13,162

No rain fell during the growth of any of these crops.

It will be seen that about six tons of green fodder, worth about Rs. 48, were obtained without any rain whatever between March and May. If paddy is harvested in January or February, as it usually can be, the outturn would be still more satisfactory, as the land would then always be moist enough to give a good start to the crops. This practice is worth imitation by the ryots, being very simple and inexpensive.

44. A noticeable fact regarding this crop is the time the seeds may lie dormant in the soil and yet germinate later on under favorable conditions. A crop of Planters' friend having been harvested from the northern part of field No. 16 at the end of January, it was sown with horse-gram, which germinated unevenly, but grew tolerably well without any rain till the 21st April. The soil of the field is very sandy, and there had been no rain at all for about a fortnight previous to the sowing, and consequently the crop did not germinate in 2 or 3 spots, which were quite dry ; but the seed was only lying dormant there and was stimulated to germination by a fall of rain which occurred on April 21st, nearly 2½ months after the sowing, and has since come up well. Another interesting instance of the power the crop has of producing a good crop of fodder under adverse circumstances is the following :—Immediately the ploughing match held on the land near the toll-bar in January was over, the plots of Class I and Class II were ploughed once more, harrowed and sown. The horse-gram germinated and grew very luxuriantly, and though it was reaped within forty-three days after sowing and dried thoroughly, it gave 1,187 lb. of dry fodder, or about 892 lb. per acre, the area of the plots being about 1·33 acres. It would be a great boon to the country if the ryots would endeavour to grow horse-gram as far as possible either for fodder to their cattle, or for green manure to their summer crops of gingelly and cumboo, immediately after the harvest of their paddy, instead of allowing their lands to become hardened as at present.

45. *Ensilage.*—This process, which has of late attracted so much notice in Europe and America, again came to the front in India during the year, and during the discussion which ensued the following letter was written by Mr. Robertson :—

" With reference to your endorsement, No. 1102, dated the 24th August 1883, I have the honor to invite your attention to my letter, No. 152, of the 14th of February 1878, printed in G.O.,

No. 544, of the 6th of April of the same year. It is now 5 years since I wrote that letter, but I see no reason to change the views therein expressed. I would particularly invite attention to the last paragraph of Mr. Schiffmayer's memorandum printed with my letter. The ensilage process is a very expensive one, and its results exceedingly variable. A silo cannot be made in this part of India air-tight and water-tight unless by the use of concrete, brick-in-chunam, or cement, and these are costly materials. Very opposite opinions are held in England by practical farmers regarding the value of the ensilage system for storing fodder. Sun-dried fodder properly cured (like good hay) cannot but be a superior article of diet to the half-decomposed contents of a silo."

46. *Unirrigated Corn Crops.*—The area sown with these was 16·43 acres, excluding 7·56 acres of the following crops, which had to be cut for fodder :—

Field.	Crop.	Area.
		ACRES.
No. 13	Yellow cholum ..	1·15
„ 15	Maize	1·62
„ 33	Amber sugar-cane ..	1·18
„ 16 South ..	Planter's friend ..	1·83
„ 10-A	Maize	1·08
„ 10-B	Do.	·70
	Total ..	7·56

The usual statement regarding crops of this sort will be found in Appendix II-B. These were the crops which suffered most from the unfavorable nature of the season. Maize, Planter's friend, and amber sugar-cane suffered most, but, considering the season, the outturn must be regarded as satisfactory. The want of uniformity in the crops which were most affected by the weather was most striking and brought out clearly the inequalities in the condition, richness, and situation of the soil in different parts of the same fields. In some cases, on a close inspection of the crops, it was found that those parts of the fields in which the crops were healthy and luxuriant were higher and of course better drained than the neighbouring parts where the plants were pale and stunted.

47. *Maize.*—About the third week of November the maize crop was unhealthy and flowering prematurely, though the rains had ceased for a time. Everything that could be done by hoeing, ploughing, thinning, &c., to stimulate the growth of the crops was done, and they were manured with 1,000 lb. of cocoanut-cake per acre. They improved very much in appearance, but the cobs on the plants in No. 15 and the eastern portion of No. 10 were so small that it was thought best in December to cut them out for fodder.

The only crops that did at all fairly well were those in the southern side of No. 10 west and No. 4 west. Field No. 10 had been well treated and lay well for drainage. On it the cobs were of a decent size and it was reserved for seed, all the inferior plants having been pulled up. The area of the portion was ·75 acres, but only half that area was occupied by maize, the other half being occupied by cotton. The plants reserved for seed were widely scattered. The outturn of 175 lb. of grain from $\frac{3}{8}$th acre was beyond expectation. The grain was fine and well formed, so that the cobs made a very good show at the Agri-Horticultural Gardens, where they were exhibited. The crop in field No. 4 was sown on the 25th October. It had to endure very heavy rains for about a fortnight after sowing, whereby its growth was materially checked ; but later on the weather was favorable. The outturn was 511 lb. of grain per acre.

48. *The amber sugar-cane* sown in No. 33 was treated in the same way as the maize crops. It was for the most part not above a foot high when flowering, but was not benefited like the maize by the treatment pursued and was cut out for fodder. It is very much to be regretted that this was necessary, as the crop was almost the only resource for seed available.

49. The Planter's friend grown in No. 16 was a poor crop though well treated. That grown in field No. 15 and the *S. saccharatum* in No. 12 will be found referred to under the heading Manures. The Planter's friend grown in No. 12, having been sown about the middle of November, gave better results than field No. 16 and a fair crop.

50. Two crops which caused much disappointment were the shamay crop in No. 37 and the broom millet in the southern portion of field No. 14. The shamay grew very luxuriantly, and its panicles were so well developed that it was expected to give very good results, but the heavy rains appear to have washed off the pollen from the flowers, so that the yield is very much below what was expected. The broom millet in No. 14 recovered during the dry interval between the 20th November and 11th December, but it was apparently injured in the same manner as the shamay crop in No. 37 by the heavy rains which then set in.

51. *The raggy crop* in field No. 11 yielded a remarkable outturn, whilst all the other unirrigated corn crops failed on account of excessive rain. The total area sown with raggy on the farm, including the botanical garden, was 6·36 acres, and the total outturn was 4,757 lb. grain and 14,858 lb. straw, or 748 lb. grain and 2,336 lb. straw per acre. In field No. 11 alone, where the soil is comparatively good, the yield was 1,084 lb. grain and 4,976 lb. straw per acre; while in field No. 23, which is very poor and sandy, the outturn was about 296 lb. grain and 1,391 lb. straw; and the average outturn from field No. 8 and the C. plots of the Botanical garden was 718 lb. grain and 1,172 lb. straw. The proportion of grain to straw differed very much in these cases. In No. 11 it was about 1 : 3; in No. 23, 1 : 6; whilst in the Botanical garden it was not properly determinable. There was a considerable loss by shedding from the crop in No. 11 field, as it was not reaped early enough, for, according to previous experience, it was believed that raggy does not shed its grain to any appreciable extent, and so particular care was not taken to reap the crop as early as possible. In previous years the average outturn of unirrigated raggy has been 524 lb. grain and 2,171 lb. straw, and, excepting the crop obtained from field No. 14 in 1880-81, no more than 693 lb. raggy per acre has been obtained in previous years. The outturn of 941 lb. of grain and 4,197 lb. straw obtained in 1869-70 from an irrigated raggy crop was the highest ever obtained on the farm in previous years. The outturn from No. 11 of 1,084 lb. grain and 4,976 lb. straw is therefore most satisfactory, especially in a season which proved so disastrous to the other unirrigated crops. The following table shows the outturn of raggy crops obtained in recent years :—

Year.	No. of Field.	Area of the Plot.	Outturn.			
			Grain.	Straw.	Grain per Acre.	Straw per Acre.
		Acres.	lb.	lb.	lb.	lb.
1879-80	18	2·29	1,589	1,557	693	680
1880-81	1	·595	408	1,197	686	2,012
1880-81	14	2·31	1,729	2,352	748	1,018
1880-81	33	2·36	841	2,351	356	996
1881-82	23-B.	4·2	2,099	9,437	499	2,247
1881-82	28-II	·40	170	516	425	1,290
1881-82	28-III	·99	480	1,009	485	1,019
1881-82	34-I	1·38	422	6,522	305	4,726
			Irrigated Raggy.			
1869-70	Not known.	3420 sq. yds.	665	2,324	941	4,197
1877-78	35-VII	1·20	773	9,390	640	7,779
1877-78	36-III	·94	514	3,568	547	3,796
1878-79	35-I	·35	116	1,680	331	4,800
1879-80	30	1·00	347	2,333	347	2,333

52. An experiment was made to ascertain what percentage of moisture is eventually lost by evaporation if grain is thrashed immediately after harvest with the following results; fresh raggy being taken :—

Date of Weighing.	Weight of Grain.	Loss.
	LB.	LB.
29th January	772	..
4th February	690	82
13th do.	686	4
20th do.	686	*Nil.*
	Total ..	86

or about 11·14 per cent. of the weight of fresh seed.

53. *Wheat.*—Some seed of several varieties of this crop was obtained from the Punjab and sown in the Botanical garden on plots measuring 80 square yards.

Red Wheat sown on the 3rd of December was harvested on the 6th April. The outturn was $4\frac{1}{2}$ lb. grain and 52 lb. straw, or 270 lb. grain and 3,120 lb. straw per acre.

White Wheat was sown and reaped at the same time as the red wheat. The outturn was $2\frac{1}{2}$ lb. of grain and 44 lb. straw, or 150 lb. grain and 2,840 lb. straw per acre.

The red wheat weighed 2 lb. 13 oz. per measure, or 62 lb. 6 oz. per bushel, and the white wheat 2 lb. 10 oz., or 58 lb. 2 oz. per bushel. The soil of the plots is artificial, but very sandy, and the crops were raised as garden crops. This is the only time that wheat has yielded even fairly on the Saidápet Farm, and further experiments on more retentive soils are designed.

54. *Irrigated Corn Crops.*—The total area of these crops raised during the year was 20·13 acres, of which the first crop harvested occupied 14·95 acres, the second crop harvested ·41 acres, and 4·77 acres of second crop remained standing at the end of the year.

A statement regarding these crops will be found in Appendix II-B.

55. Paddy was sown in the nurseries first on the 16th August and again in September in order to provide seedlings for transplanting in September and October respectively; but the cultivation of the crop in the fields could not be commenced till the middle of the latter month, as during September the weather was unsuitable and the first fortnight of October was utilized for planting casuarinas, on land not so easily under command for irrigation as the land devoted to paddy. The seedlings from the first sowing were therefore two months old when the tillage of this land began, whereas the best time for transplanting them is when they are about four weeks old. All the goondoo-sumba seedlings were put out however, as this variety is a six months' crop and able to recover and grow when planted as two months' seedlings. The car and Madagascar paddy seedlings were cut for fodder.

As an experiment, one plot in No. 29 was planted with seedlings 61 days old on the 16th October, and another alongside with seedlings 29 days old on the 27th. The outturn of the former was 1,756 lb. grain and 7,561 lb. straw per acre, whereas from the other plot 2,685 lb. grain and 11,421 lb. straw per acre were obtained.

A small plot of car paddy raised from two months old seedlings gave the very low outturn of 433 lb. grain and 4,900 lb. straw per acre.

As the two months old car and Madagascar paddy seedlings were useless, a large area of the wet lands had to be sown with sprouted paddy broad-cast. The sprouts were very much injured in fields Nos. 30, 31, and 36 by the very heavy showers which fell soon after sowing.

56. The Carolina and the Madagascar seed of paddy of the last harvest proved to be very much mixed with indigenous varieties. The true Carolina paddy plants were carefully picked out this year and thrashed, and a quantity of genuine Carolina paddy was thus obtained for future propagation.

57. Irrigation experiments similar to those referred to in paragraph 33 of the last year's report were made with 2 indigenous varieties of paddy in field No. 35 on plots measuring each 1,080 square feet which were planted on the 2nd November with seedlings 55 days old, the varieties being goondoo-sumba, and another variety of sumba paddy originally obtained from North Arcot. During the growth of the crop 26·76″ of rain fell on 21 days, and the crops were harvested on the 18th March.

The following statement gives the results :—

Number of Plot.	Variety of Paddy.	Number of Times watered.	Quantity of Water applied each Time.	Equal to Rainfall.	Total Quantity equal to Rainfall.	Total Supply of Water equal to Rainfall.	Outturn.			
							Total.		Per Acre.	
							Grain.	Straw.	Grain.	Straw.
			C. FT.		INCHES.	INCHES.	LB.	LB.	LB.	LB.
1	Goondoo-sumba	13	90	1 inch.	13	39·76	38½	536½	1,553	21,638
2	Do.	13	180	2 inches	26	52·76	41	491	1,654	16,470
3	Do.	13	270	3 ,,	39	65·76	33	548	1,331	22,103
4	Sumba paddy	12	90	1 inch.	12	28·76	28	329	1,129	13,270
5	Do.	12	180	2 inches	24	50·76	20	302	807	12,181
6	Do.	12	270	3 ,,	36	62·76	19½	224½	786½	9,055

The results of the experiments must have to a certain extent been vitiated by the heavy rainfall of the early part of November, but the following figures show them clearly :—

Plots watered each time with	Yielded per Acre.			
	Grain.		Straw.	
	Average.	Ratio.	Average.	Ratio.
	LB.		LB.	
1 inch of water	1,341	100	22,459	100
2 inches of do.	1,230	91·7	14,325	63·8
3 do. of do.	1,059	78·9	15,579	69·3

These figures show very fair crops for the soil on which they were grown, and also, as far as they go, that the smaller quantity of water produced the best outturn, thus pointing in the same direction as all figures hitherto obtained have done; viz., that a much smaller quantity of water than is commonly used by the ryots will suffice to produce very good crops. At present preparations are being made for carrying out a series of irrigation experiments on a larger scale. It will be necessary, however, to wait some years before any definite results can be looked for.

58. *Industrial Crops.*—The area sown with these crops during the year under report was as follows :—

	ACRES.
Cotton	9·62
Castor-oil seed	·50
Indigo	5·57
Total ..	15·69

Of this, 2·36 acres of cotton totally failed on account of the unfavorable season. The castor-oil seed was sown between the lines of casuarina seedlings for shade. The indigo was grown for seed. These crops will be referred to next year.

59. *Cotton.*—The outturn of cotton-in-seed in 1883 from 12·62 acres was 4,337 lb., or 343·6 lb. per acre, which yielded 1,328 lb. of lint, or 105·2 lb. per acre. The next table gives the details.

Number of Field and Plot.	Area of Field.	Sowing.			Details of Harvesting.		
		Date.	Amount sown.	Per Acre.	Date.	Outturn of Cotton-in-seed.	
						Per Plot.	Per Acre.
	ACRES.		LB.	LB.		LB.	LB.
4-A	2·8	16th September 1882.	80	28	Up to 29th Sept. 1883.	1,353	483·2
12-A and D ..	1·63	7th October ,,	26	16	,, 8th ,, ,,	620	186·75
12-B	·90	7th ,, ,,	14	16	,, 25th Aug. ,,	408	453·3
12-C	·90	7th ,, ,,	14	16	,, 15th Sept. ,,	314·5	349·4
13	2·70	4th September ,,	25	9	,, 15th ,, ,,	646	239·2
16 East ..	1·83	12th ,, ,,	24	13	,, 4th ,, ,,	554	302·6
16 West ..	1·83	12th ,, ,,	30	16	,, 4th ,, ,,	442	241·5

All the crops were occasionally watered. Field No. 4 gave the best results, yielding 483·2 lb. of cotton-in-seed, or 152 lb. of clean lint per acre.

60. The following table gives the usual information regarding the yield of lint at different times of the year from all the crops:—

Months.	Field 4.			Field 13.			Field 12-A and D.			Field 12-B.		
	Cotton-in-seed.	Lint.	Percentage of Lint.	Cotton-in-seed.	Lint.	Percentage of Lint.	Cotton-in-seed.	Lint.	Percentage of Lint.	Cotton-in-seed.	Lint.	Percentage of Lint.
	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
February and March ..	268	83	31·0	331	105	31·7	199	62·5	31·4	99	30·5	30·8
April	83	25·25	30·0	47	14·5	30·8	..	..	..	..	..	..
May	298	102	34·0	93	28	30·1	129·5	38	29·3	107	34·25	32
June and July ..	472	149	31·5	175	44·75	25·6	140	38·5	27·5	125	33·5	26·8
August	117	30	25·6	..	..	..	78	24·25	31	47	13·75	29·2
September ..	115	36·5	31·7	..	..	..	73·5	23·5	31·9	30	9·5	31
Total ..	1,353	425·75	..	646	192·25	..	620	186·75	..	408	121·5	..

Months.	Field 12-C.			Field 16 East.			Field 16 West.			Total.		
February and March ..	76	23·75	30·8	159	51·25	32·2	94	28·75	30·5	1226	384·75	31·4
April	..	..	..	38	11·75	30·9	12	3·75	31·0	180	55·25	30·7
May	108	34	31·5	110	32	29·1	82	26	31·4	927·5	294·25	31·7
June and July ..	85	21·25	25	57	16	28·1	38	10	26	1092	313	28·7
August ..	24	6·5	27·1	25	7·5	30	42	12·75	30	333	94·75	28·4
September ..	21·5	6·5	30·2	165	53·5	32	174	56·5	32·4	579	186	32·1
Total ..	314·5	92	..	554	172	..	442	137·75	..	4337·5	1328	30·6

61. In paragraph 29 of the last year's report the outturn of maize from the east and west plots of No. 16 were given as comparing the results of the "Hill" and "Ridge" systems of growing the crop. The outturn of cotton was as below:—

	Cotton-in-seed.	Lint.	Percentage. of Lint.
Hill System—	LB.	LB.	LB.
East plot	554	172	31·04
Ridge System—			
West plot	442	137·75	31·16

Larger outturns of both maize and cotton were thus obtained from the plot treated in the hill system.

62. *Nankin Cotton.*—A plot, ¼ acre in extent, sown with this variety in the Botanical garden on the 5th December 1882, has yielded up to date only 37 lb. cotton-in-seed. Another plot was sown in field No. 4 after it was well tilled and manured, but up to date it has yielded only 5 lb. of cotton-in-seed. The growth of the crop was retarded by the heavy rains of December, but it is now looking promising.

63. *Yca Valley Cotton.*—A plot, about ½ acre in extent, in the Botanical garden only yielded during the year 62½ lb. cotton-in-seed. The variety appears to have a great tendency to run to wood; this may be owing to the crop being watered.

64. *Indigo.*—The outturn from the crop in field No. 19 up to the 1st May was given in last year's report, paragraph 35. From the 1st May up to the 1st December, when it was taken out, it yielded 1,042 lb. of seed, or 347⅓ lb. per acre. This was sold at 5 measures per rupee, 1 measure weighing about 3⅛ lb. During December there was a large demand for it even at 4 measures per rupee, but the supply was not equal to the demand. The seed was much appreciated by the ryots as it had been obtained from plants which had not been cut at all, whereas they generally obtain their indigo seed from plants which have been cut twice. One man, who purchased some farm-grown seed, stated that the plants raised from it were taller and more luxuriant than the indigo crops of previous years, though the season of this year was somewhat adverse to indigo.

65. *Manilla Hemp.*—The plot occupied by this crop was enlarged by about ¼ acre during the year. The plants are doing well though rarely watered. It has had not more than four waterings in the year.

66. Some experiments were made with better success than in former years in preparing fibre fit for cordage. The following are the results:—

Experiment No. 1.—A plant which was about to flower was cut down on March 11th and gave the following data:—

Weight	88½ lb.		
Girth at base	2′ 4″		
„ at top	1′ 4½″		
Layers fit for fibre-making		Outer	Number, 8. Weight, 24 lb.
		Inner	Number, 14. Weight, 49 lb.

After scraping the sheaths roughly, the outer ones weighed 9 lb. and the inner ones 19 lb., and the rejected portion of the stem 60½ lb. The sheaths were then buried in sand on the river-side till the 22nd March, or for 11 days. The fibre was then cleaned by beating the sheaths on a rock and washing. The inner sheaths gave 4 ounces of fibre and the outer sheaths 9 ounces, or in all 13 ounces from the tree. The fibre was dark-colored, but would answer well for cordage. The labor required for the whole process was not more than 2 hours' work. The cost of preparation may be estimated at about 1 anna per pound.

Experiment No. 2.—A plant was cut down about the flowering stage. The stem had the following dimensions:—

Weight	97½ lb.		
Length	6′ 7″		
Girth at base	2′ 6″		
„ at top	1′ 8″		
Layers fit for fibre-making		Outer	Number, 11. Weight, 42$\frac{13}{16}$ lb.
		Inner	Number, 13. Weight, 42 lb.

The outer sheaths after being scraped weighed 16 lb. and the inner layers 13 lb. The sheaths were then steeped in clear water in a cistern. The sheaths were well rotted by the 18th March, when they were taken out and beaten on a rock and washed. The outer sheaths gave 12 ounces of fibre and the inner 5 ounces, or a total of 1 lb. 1 oz. The fibre was the whitest and the finest ever obtained on the farm by the process of steeping. The fibre produced in all the previous experiments had a large quantity of the pulp adhering to it in numerous pellets, but in this experiment the product was clean. The trees on the farm are planted 6′ × 6′, but this is rather close, and 1,000 trees per acre could be easily raised and cut every year after the first even in the climate of Madras if occasional irrigation is resorted to. Supposing that each tree yields ¾ lb. of fibre, the outturn per acre would be 750 lb., and, taking that at 2 annas a lb., it would be worth Rs. 93-11-0. With good cleaning a much higher price should be obtainable.

67. This plant is chiefly valued for its fibre and cut before the fruit forms; however the ripe fruit would not be unpleasant eating were it not for the excessive number and proportion of seeds it contains. The following statement will give a fair idea as to the proportion of these :—

Fruit.		Weight of				Seeds.
Length.	Girth.	Fruit.	Peelings.	Seed.	Pulp, dry.	Number of Seeds in a Fruit.
6½″	4½″	1·90 lb.	4 oz.	¾ oz.	11½ oz.	139

As may be imagined from these figures, it is a troublesome matter to eat the fruits, though they are sweet and of a pleasant flavor. Though the fruit is not acceptable to the higher classes, it is valuable even if used only for feeding cattle. Bunches were found to average 120 lb., each fruit weighing about 4 oz.

68. The unripe fruit when made into curry has a remarkably astringent character.

69. An experiment was made in extracting starch from some fruits which were not fully ripe, when the following figures were obtained:—

Fruits taken ..	Number, 38 Weight, 18 lb. Average girth, 5″	Weight of	Peelings, 8 lb., or 44·5 per cent. of fruit. Pulp, 6 lb., or 33·3 do. Seeds, 4 lb., or 22·2 do.

The large proportion of seeds is partly due to the fruits having been unripe and the pulp consequently adhering to the seeds. The yield of starch was ½ lb., or 2·71 per cent. of the fruits and 8·3 per cent. of the pulp. It was greyish white in color, soft to the touch, did not become viscid when mixed with water, and tasted like rice flour. The process adopted was to peel the fruits with a wooden knife, squeeze the pulp in water, and extract the seeds. The pulp was then dried in the sun for a day and powdered with a wooden pestle, and the powder sifted through a piece of cloth.

70. *Casuarinas.*—The area planted with this tree during the year was 11 acres, and besides this 12,000 seedlings were planted in blanks in other topes; these were planted 6′ × 4′, and, calculating 1,800 trees per acre, the area of blanks filled is equivalent to 6⅔ acres planted. All the worst portions of the farm have now been planted, and no more planting is apparently necessary at present except to fill any vacancies which may be caused by failures, &c.

71. In a small tope, about 7 years old, which had not grown very well, guinea grass was found to grow fairly under the shade of this tree, and it has since been found a good plan to plant casurianas in fields already planted with the grass, the trees being planted in every third row of guinea grass four feet apart. By this means some fodder is obtained from the land whilst the casuarinas are growing up, and the presence of the grass prevents people from sweeping up the leaves of the casuarinas which fall on the land planted with them. One of the most valuable uses of casuarina on poor lands, such as those of the farm, is to improve them by the leaves they shed. From 10½ acres of casuarina plantation on the farm, 40,234 lb. of fodder was obtained during the latter half of the year and the guinea grass was ready to be cut again in many of the plantations.

72. The casuarinas planted about the middle of November 1881 are thriving remarkably well. They are about 40 feet high on the average with a girth of about 9 inches at 3 feet above the ground. The initial cost of ploughing the land twice, harrowing, ridging, pitting, and planting casuarinas and guinea grass is not more than Rs. 12 per acre on the average. The casuarina tope in field No. 17, which is about 3 acres in extent, has cost about Rs. 113-8-0 up to date for watering, and the trees are now fairly established and will probably require no more watering. The irrigation charges per acre for this casuarina plantation are thus about Rs. 38. The total expenditure per acre for establishing a casuarina plantation with guinea grass between the

lines is thus not more than about Rs. 50. As an acre carries 1,800 trees, the cost of each established tree is about 6 pies. These plantations need to be thinned so as to leave the trees 8 feet in the rows, they at present being 6′ × 4′.

73. The following statement shows the rate of growth of a casuarina plantation planted in 1881, 6′ × 4′.

Sample area 1½ acres carries 1,800 trees per acre 2½ years old.

—	Dimensions of Trees.			Form Factor used.
	Girth.	Height.	Cubic contents.	
	INCHES.	FEET.	C. FEET.	
Mean	7½	26	40	·50

Growth yearly.

Individual increment	16 cubic feet.
Acre increment	6·4 tons.

The maximum girth at 5 feet from the ground is 11½ inches, and the minimum girth 3½ inches. The maximum height is 32 feet and the minimum height 20 feet. Those trees which are situated near the water channel in which irrigation water is almost daily flowing in the hot weather are more than 40 feet high and have a girth of more than 1 foot; on the other hand there are a few very small trees which were planted to fill the blanks; such trees have been excluded from the calculation.

74. Three casuarina plantations, which are about five years old, were thinned during the year. The plantations are situated on high ground and are only irrigable by hand. The yield of fuel was therefore small. The following statement shows the quantity of the green wood, toppings, and roots obtained from the thinnings:—

Tope.	Area.	Number of Trees		Weight obtained of		
		Cut out.	Left.	Wood.	Toppings.	Roots.
	ACRES.			LB.	LB.	LB.
G	1·25	110	830	2,834½*	..	373
O	1·95	667	2,339	7,644½	2,000	762
K	1·17	216	657	3,226	1,162	373

75. *Divi-divi* (*Caesalpinia coriaria*) was planted on three acres. The land having been ploughed and ridged, was planted 15′ × 15′. The total number of plants put out on the farm exclusive of those planted on the channel banks is 521. They are thriving very well and are apparently hardy. Guinea grass is planted between the lines of Divi-divi in one of the plantations. Castor seed was sown between the lines elsewhere, but the crop was spoiled by the heavy rains and by inundation from the river.

The 16 bushes of Divi-divi planted in 1879 in the Botanical garden gave during the year 75 lb. pods. 22 lb. of the pods gave 2 lb. seed.

76. *The Eucalyptus* trees planted in the botanical garden 5 years ago continue to thrive. Of these, the *tereticornis* has made the most progress and the *bicolor* the least as the statement below shows. All the varieties, except *paniculata* and *hemipholia*, were obtained from Queensland through the Director of the Botanical Gardens, Brisbane, and the Acclimatization Society. The growth of the trees has been very great, but so has been the care bestowed on them. It remains to be proved whether they will stand ordinary treatment when put out in plantations. A considerable quantity of seed has been obtained from Australia for distribution in the districts, it being thought inadvisable to trust to the seed of young immature trees for raising

* Include toppings.

plants in this country. The following table gives information of interest regarding these trees :—

Botanical Name.	Common Name.	Age, April 1884.	Largest Specimen.				Remarks.
			Height.		Girth.		
			1882.	1884.	1882.	1884.	
		YEARS.	FEET.	FEET.	INCHES.	INCHES.	
1. Eucalyptus tereticornis ..	Red gum	$4\frac{1}{2}$	$27\frac{2}{3}$	$46\frac{3}{4}$	11	20	One of the trees flowered this year, but did not seed.
2. Do. citriodora ..	Lemon-scented gum ..	$4\frac{1}{2}$	$17\frac{1}{2}$	$39\frac{1}{4}$	8	15	Flowered and seeded.
3. Do. paniculata ..	Common iron bark ..	$5\frac{1}{2}$	$26\frac{2}{3}$	32	17	17	The large tree measured in 1882 was blown down.
4. Do. resinifera ..	....	$4\frac{1}{2}$	$15\frac{3}{4}$	$25\frac{1}{4}$	11	18	
5. Do. ——— ..	Yellow mahogany ..	$4\frac{1}{2}$	$5\frac{3}{4}$	$25\frac{1}{4}$	$2\frac{1}{2}$	18	
6. Do. rostrata ..	....	$4\frac{1}{2}$	$17\frac{1}{3}$	$25\frac{1}{2}$	10	16	
7. Do. goniocalyx ..	....	$4\frac{1}{2}$	$13\frac{1}{3}$	$23\frac{1}{4}$	7	12	
8. Do. sideropholia ..	Dark or broad-leaved iron bark.	$4\frac{1}{2}$	$18\frac{1}{2}$	22·0	7	11	
9. Do. bicolor ..	Black box	$4\frac{1}{2}$	$10\frac{1}{3}$	$18\frac{3}{4}$	6	10	
10. Do. hemiphloia ..	Common box	$5\frac{1}{2}$	24	..	15	..	Trees growing in 1882 cut down, being distorted.

77. The following exotic trees were planted out during the year :—

Where planted.	Eucalyptus.	Ceara Rubber.
Western channel ..	235	..
Eastern channel ..	27	56

78. *Cocoanut Trees.*—There are now 85 mature cocoanut trees on the farm. They are bearing fairly well. The trees planted on the saltish soil of No. 30 having been found to thrive well, it was resolved to reclaim the western portion of field No. 28, which is apparently of the same character. The land was laid out in a series of parallel ridges, each about 12 feet broad at the base and about 1 foot broad at the top and about 3 feet high in the centre. The actual cost of laying out the field in this manner was Rs. 11 per acre. Cocoanuts are planted on the crest of each ridge 18 feet apart. Casuarinas are planted on the slopes of the ridges, so as to be alternate with the cocoanut trees, 8 feet apart between the rows and 6 feet apart in the rows. The casuarina trees will, of course, be cut down as the cocoanut trees advance in growth. The cocoanuts and the casuarinas are thriving equally well on the saltish land. The object of laying out the ground in the manner above stated is to procure good surface drainage.

79. *Miscellaneous Crops—Plantains,* 1·47 *acres.*—These are growing in No. 35 field and are intended chiefly to afford shade to the young cocoanut trees there. Those plantains which are found to interfere with the growth of the cocoanut trees are at once cut down. From this field 746 bunches were obtained during the year. During the cold weather the plantain crop suffered very much from excessive moisture, though ample provision was made for surface drainage.

Chillies, 1·48 acres, in No. 11 field, did not do so well as in the previous year, the land being frequently overrun with weeds. The vegetable compost which was applied to the soil probably contained germs of weeds in such abundance that the young crop was very soon overrun, and though the crop was frequently hand-hoed and the weeds carefully removed, it was not found possible to keep the land clean. The crop was removed whilst in full bearing, but still the yield was 1,211 lb. green and 305 lb. ripe chillies.

White linseed, obtained from Saharanpore, was sown in field No. 4 on the 26th January. It flowered within twenty days after sowing, but no seeds were developed in the capsules. The same was the case with some seed grown in the Botanical garden.

Ram-til oil seed—(*Guizotea oleifera*), called in Tamil Pay-Yellu, was sown on 15th September in a small plot in the Botanical garden. Gingelly was sown in another plot alongside on the same day, but failed on account of the heavy rains. The Ram til oil seed withstood the rains and produced 2 lb. of seed on 80 square yards.

Maryland, Virginian, and Havannah varieties of tobacco were planted in the Botanical garden when the seedlings were about six weeks old, and were harvested in the middle of May. The Virginian variety produced 10½ lb. of seed from a plot ⅛ acre in extent. The Havannah variety produced from a similar plot 9½ lb. From ¼ acre of Maryland tobacco 22 lb. of seed was obtained.

Manures.

80. The manures used during the year were cattle manure, blood manure, stable refuse, white castor cake, cocoanut cake, common salt, gypsum, slaked lime, broken bones, and saltpetre. The cattle manure consisted of the dung, urine and litter of the working cattle, collected in their boxes, together with the cleanings of the cow-sheds, the sheep-sheds and the poultry-house, which are thrown into the boxes every morning. The box manure, which was available towards the end of November, was not well decomposed, and therefore not in first-class condition for application. The blood manure was collected at the Commissariat slaughter-yards, and was in very good condition, thoroughly decomposed, friable and inodorous. The stable refuse was obtained from the batteries of artillery at St. Thomas' Mount at 3½ annas per cart-load. The cold-weather crops derived no great benefit from its application on account of the excessive rainfall. The last supply of white castor cake was obtained direct from an oil-mill at Kalattipet near Teruvothyoor at Rs. 5-14-0 per candy of 500 lb. The proprietor of the mill had been burning the oil cake previously. Cocoanut cake was purchased for the most part at Rs. 2-8-0 per candy; it was more friable than the castor cake, but it is far inferior to it as a manure, as the following analyses show:—

	White Castor Cake.	Cocoanut Cake.
	PER CENT.	PER CENT.
Moisture	10·19	13·04
Oil	11·57	10·93
Albuminoids *	48·62	18·87
Digestible fibre and mucilage	11·56	43·06
Cellulose	8·16	6·30
Mineral matters (ash) †	9·90	7·80
Total ...	100·00	100·00

It is thus obvious that, so far as nitrogen only is concerned, about 258 lb. of cocoanut cake is equivalent to 100 lb. of white castor cake. Unfortunately the analysis does not show the proportion of soluble ash in the cocoanut cake.

White castor cake caused a decided improvement in crops to which it was applied, whereas liberal applications of cocoanut cake did little good. For instance, the Carolina paddy in the eastern part of field No. 34-B was stunted and unhealthy when it was about 1½ months old. On applying white castor cake at 300 lb. per acre there was a striking change for the better, and in a short time the crop far surpassed that in the western plot, which was at first much better, and to which only cocoanut cake had been applied.

81. Common salt was used experimentally as a top-dressing for the raggy crop, which is looked on by the ryots as a salt-feeder. Ten plots, each measuring 408⅜ square yards, were laid out in field No. 11, running north to south, the drainage of the field being in that direction, so that the salt applied to one plot might not be washed

* Containing nitrogen	7·78	3·02
† Containing sand	2·07	..
Soluble portions of ash	7·83	..

by the rains into another plot. A space of 1 foot was left between every two plots. When the raggy crop was twenty-six days old, it was bullock-hoed and the salt applied and hoed in next day. To ensure uniform distribution, the salt was mixed with enough sand to make the mixture in the case of each plot up to 500 lb.

The following statement shows the results :—

Plot.	Salt applied per Plot.	Outturn.			
		Per Plot.		Per Acre.	
		Grain.	Straw.	Grain.	Straw.
	LB.	LB.	LB.	LB.	LB.
1 and 6	...	128½	481	3,034	11,714
2 and 7	10	132	470	3,129	11,140
3 and 8	20	141½	511½	3,356	12,123
4 and 9	30	137	517	3,257·5	11,661·7
5 and 10	40	138½	536½	3,282	12,717

The plots were small and too narrow, and the results do not give any decided result. However, there was a marked difference between the experimental portion of the field and the remaining part as regards the outturn of the crop, as the following statement shows; the difference may, however, not be due to the salt applied :—

—	Area.	Grain.	Straw.	Grain per Acre.	Straw per Acre.	Ratio of Grain.	Ratio of Straw.
	ACRES.	LB.	LB.	ACRES.	ACRES.	LB.	LB.
Experimental plots	·85	1,355	5,032	1,505	5,591	100	100
Non-experimental portion	2·11	1,855	8,126	900·5	3,944	59·8	70·5

82. Another experiment with salt was made in field No. 12 as a top-dressing for *Sorghum saccharatum*. The area occupied by the crop was 1 acre; half an acre was dressed with 250 lb. gypsum, or at the rate of 500 lb. per acre, on the 29th December, when the crop was about forty-four days old; $\frac{1}{12}$ acre was dressed with 16¾ lb. salt, or about 200 lb. per acre, on the 15th December, when the crop was about a month old; and the intermediate portion of the crop, $\frac{5}{12}$ acre, was left unmanured. The salt was mixed with sand for even distribution over the plot. The following statement compares the outturn of the plots :—

—	Area.	Grain.	Straw.	Grain per Acre.	Straw per Acre.	Ratio of Grain.	Ratio of Straw.
	ACRE.	LB.	LB.	LB.	LB.	LB.	LB.
Dressed with salt	$\frac{1}{12}$	60	960	720	11,520	100	100
Do. with gypsum	½	180	940	360	1,880	50	16·3
Unmanured	·625	56	728	89·6	1164·8	12·4	10·1

The results are not duplicated, and therefore can scarcely be trusted.

83. The following experiment with slaked lime was made in field No. 12. Two plots, each ·90 acres, were laid out. To one of them, plot B, 9 cart-loads of blood manure and 900 lb. slaked lime were applied, and to the other, plot C, 9 cart-loads of blood manure only. The outturn of cotton from the two plots was as follows :—

—	Area.	Cotton in Seed.	Per Acre.
	ACRE.	LB.	
Plot B	·90	408	564$\frac{4}{9}$
Plot C	·90	314·5	349$\frac{4}{9}$

84. *Green Manuring.*—In field No. 15 six plots were laid out, each measuring $\frac{1}{8}$ acre, with a space of 1 foot between each pair. Horse-gram (*Dolichos uniflorus*) was sown on the 26th June. That grown on plots 1 and 5 was fed off by sheep; in plots Nos. 2 and 6 it was reaped and removed; and in plots 3 and 4 it was ploughed in as green manure. Plot 1 was grazed by twenty rams from the 11th to the 15th August, the sheep being always confined within hurdles, which were moved every day from one portion of the plot, after it was grazed down, to another. The sheep were sheltered during the day under a moveable shed. The manure which accumulated during the heat of the day was evenly distributed over the plot. So long as the sheep were folded on the land, they had no other food but the horse-gram, and water was brought to them to drink. The weather during the nights being favorable, the sheep were always on the land during the progress of the experiment. On the morning of the 16th August, as soon as plot 1 had been grazed down, it was ploughed up; crop in plot 2 was reaped and removed and the plot ploughed; and the horse-gram in plot 3 was ploughed in. Plot 5 was grazed from the 16th to the 20th August, both days inclusive, and on the morning of the 21st August, when the grazing of plot 5 had been finished, the plots of the second series were treated in the same way as the plots of the first. Plots 2 and 6 gave 516 lb. and 648 lb. of horse-gram plants, respectively, on being reaped, or on the average 4,656 lb. of green plants per acre. Plots 3 and 4, which were green manured, therefore probably received so much more organic matter per acre than plots 2 and 6, and plots 1 and 5, which were grazed by sheep, so much more organic matter than plots 2 and 6, *minus* the portion assimilated by the sheep. After horse-gram yellow cholum was sown. But it was so much injured by rain that it was cut for fodder, and Planter's friend was sown in its stead. The following statement gives the results of the experiment:—

Plot.	Treatment.	Outturn of Yellow Cholum Fodder.		Outturn of Planter's Friend.			
				Per Plot.		Per Acre.	
		Per Plot.	Per Acre.	Grain.	Straw.	Grain.	Straw.
		LB.	LB.	LB.	LB.	LB.	LB.
1	Grazed	162	1,296	40	632	320	5,056
2	Reaped	119	952	34	610	272	4,880
3	Ploughed in	140	1,120	38	494	304	3,952
4	Do.	234	1,872	37	617	296	4,936
5	Grazed	126	1,008	48	770	384	6,160
6	Reaped	67	536	28	616	224	4,928

The average of the results is as follows:—

Plots.	Treatment.	Yellow Cholum Fodder.		Planter's Friend.			
				Per Plot.		Per Acre.	
		Per Plot.	Per Acre.	Grain.	Straw.	Grain.	Straw.
		LB.	LB.	LB.	LB.	LB.	LB.
1 and 5	Grazed	144	1,152	44	701	352	5,608
2 and 6	Reaped	93	744	31	613	248	4,904
3 and 4	Ploughed in	187	1,496	37½	555½	300	4,444

The best results were, as might be expected, obtained from the plots fed off by sheep, and the next from that green manured. This experiment will be continued.

85. As proposed in paragraph 62 of the last report, the experiment in No. 8 field was continued without manure, and raggy was sown. The crop was drilled in on 6th October in lines 9 inches apart, 12 lb. of seed being sown. Its early growth was checked by the weather experienced, and the land became very foul with weeds from the same cause. The crop was harvested on the 28th January and threshed out immediately;

the weight of the grain is therefore proportionately high. In the following table the yield of the plots, referred to last year, is shown for the four years they have been dealt with; their area is $\frac{1}{10}$ acre. It is almost useless to attempt to deduce anything from these figures, as they are not duplicated, and, even if they were, there is so much suspicion attaching to the original quality of the soil of the plots that deductions would be dangerous. The large outturn from plot 10 in the last year was probably due to its having received the wash off a piece of heavily manured land adjoining; otherwise it is inexplicable:—

Plot.	Manures applied.	1880 Outturn.		1881 Outturn.		1882 Outturn.		1883 Outturn.		Total.	
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
3	1880 1 ton Farm-yard manure .. 1881—83 Nil	95	531	60	840	66	466	65	106	286	1,943
4	1880 Nil .. .. 1881 ½ ton Farm-yard manure .. 1882-83 Nil	54	291	99	672	55	454	91	100	339	1,517
5	1880 2,860 lb. Ashes .. .. 1881—83 Nil	51	238	84	840	65	458	93	136	293	1,672
6	1880 Nil .. .. 1881 66½ lb. Oil cake .. .. 1882-83 Nil	57	281	75	840	66	421	98	154	296	1,696
7	1880 211 lb. Slaked lime .. 1881—83 Nil	48	210	61	728	48	328	45	88	202	1,354
8	1880 Nil .. .. 1881 1 ton Farm-yard manure .. 1882-83 Nil	47	218	99	896	53	370	65	122	264	1,606
9	1880 50 lb. Oil cake .. .. 1881—83 Nil	84	361	80	616	50·2	342	64	150	278·2	1,469
10	1880—83 Nil	34	191	58	560	37	364	85	172	214	1,287
	Average ..	59	290	77	749	55	400	76	129	271 5	1,568

86. The experiments referred to in paragraph 63 of the last report regarding the use of dung ashes and cattle dung for manure were continued during the year. No manure was applied, but the plots were sown on 4th October with raggy by hand in lines 9 inches apart. The crop was harvested on 3rd February 1884 with the results recorded below, to which are added those of previous years:—

Plot.	Manures applied.	Produce, 1880.		1881.		1882.		1883-84.		Total.		Average for 4 Years of Pairs of Plots.	
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
1 12	1880 Box manure alone .. 1881-82 Box manure and husk ashes .. 1881—83 Nil	25 24¾	189 172	12 6	200 139	6 5	254 204	15 28	44 56	58 63¾	687 571	15¼	157½
2 11	1880—83 Nothing	14½ 19	125 149	3 5½	75 119	3 6	72 100	7 16½	10 16	27½ 47	282 384	9·3	83·2
3 10	1880 Solid dung alone .. 1881-82 Solid dung and husk ashes .. 1883 Nothing	28¼ 28½	193 196	6½ 6½	125 143	8 6.	164 160	15 22	18 27	57¾ 63	500 526	15	128¼
4 7	1880 Nothing .. .. 1881-82 Paddy straw and husk ashes .. 1881—83 Nothing	15¾ 12½	168 177	10½ 9½	136 168	6 6	104 156	6 7	7 21	38¼ 35	415 522	9·1	117·1
5 8	1880 Bratty ashes .. 1881-82 Bratty ashes and husk ashes .. 1883 Nothing	18¾ 23½	201 198	9 9½	136 189	3½ 8½	81 152	3 14	6 16	34¼ 55½	423 555	11¼	122¼
6 9	Nothing	Omitted. 14¼	 170	5½ 9	110 164	5½ 7¾	120 124	10 16	13 15	21 47	243 473	8·5	89·5

These figures are of very little value themselves, and it is doubtful whether the experiments will be carried any further, as the land on which they were conducted has passed out of the control of the department. It is also doubtful if it is worth carrying them further.

87. Nothing further was done in No. 7 field, the testing of which was reported last year, paragraph 66, as the inequalities of the soil which were revealed rendered it useless to attempt manuring experiments. Such a state of things was not surprising in that field ; and, taking these results together with the results in No. 8 field, it is doubtful whether any really useful manuring experiments can ever be carried out on this farm. Certainly none can be till an Agricultural Chemist is at hand to afford information as to the absolute composition of the manures used. Fields Nos. 7 and 8 do not now belong to the farm, having been transferred to the Agricultural College. The arrangement is convenient and probably advisable.

Live Stock.

88. *Cattle.*—At the beginning of the year the breeding stock on the farm was as follows :—*Cows*—Aden five, Nellore two, Kerry (half-bred) one. *Heifers*—Aden three, Nellore two, Kerry one (by an Aden bull). *Bulls*—Aden eight, Punganúr one. *Bull calves*—Aden seven, Kerry one (by an Aden bull).

During the year the following were born on the farm :—Aden, bull calves two, heifer calf one ; Nellore, bull calf one, heifer calf one.

From this stock the following were sold or distributed gratis during the year :—

To Madras	1 Nellore cow and heifer calf.
„ Tanjore	1 Aden bull and 1 cow and bull calf.
„ Cuddapah	1 Aden bull
„ Salem	1 Aden bull.
„ North Arcot	1 Aden bull.
„ Madura	1 Aden bull. 1 Nellore cow and half-bred—Aden bull calf. 2 Nellore heifers. 1 Kerry bull calf.

89. In accordance with the sanction of Government, six cows with bull calves at foot and fifteen young bulls were imported from Aden in January and February last. They were brought over in two batches under the charge of two farm laborers sent from Saidápet for the purpose.

They arrived as follows :—

—	Cows.	Calves.	Bulls.
January 18th ...	3	3	8
February 12th ...	3	3	7

When they arrived they were in miserable condition, and the bulls could bear no comparison for size with farm-raised animals of the same breed and age.

90. The following statement gives the weight and measurements of the bulls on arrival here and also on 26th May, as well as the weights and measurements of some of the Farm Aden bulls. The first eight bulls were weighed on the 19th January, the next four farm-raised animals were weighed on the 22nd idem, and the last seven were weighed on their arrival, 13th February 1884 :—

No.	Marks or Distinguishing Information.	Probable Age.	Data Collected—January and February 1884. Height at the Hump.		Girth of the Chest.		Length from the Hump to the Root of the Tail.		Weight.	Data Collected—26th May 1884. Height at the Hump.		Girth of the Chest.		Length from the Hump to the Root of the Tail.		Weight.
			FT.	IN.	FT.	IN.	FT.	IN.	LB.	FT.	IN.	FT.	IN.	FT.	IN.	LB.
1	Greyish white with a tuft of hair near the root of the tail ..	About 20 months ..	3	7	4	2	2	5	304	3	11	4	7	2	9	413
2	Do. with marks of cautery on the hind-legs ..	Do. ..	3	8	4	6	2	6½	385	4	0	4	10	2	9	494
3	Do. with a mark of cautery across the buttocks..	Do. ..	3	5½	4	1	2	6	308	3	8	4	6	2	9	420
4	Greyish with a white spot on the face	Do. ..	3	6	4	0	2	6	283	4	0	4	6	2	8	392
5	Brown do. do.	About 2 years ..	3	9	4	2	2	7	306	4	1	4	4	2	8	378
6	Do. with suppressed horns	About 20 months ..	3	8	4	2	2	6	308	3	9½	4	3¼	2	7½	336
7	Do. with black spots on the fore-legs	Do. ..	3	7½	4	1	2	5	276	3	10	4	5	2	4½	347
8	Do. and white	Do. ..	3	8	4	0	2	5	276	3	9	4	4	2	6	328
9	Imported 1881 without dam	Nearly 2½ years ..	4	6	5	2	2	10	652	..		..		..		..
10	Do. out of Rani	Do. ..	4	3	5	3½	2	9	622	4	4	5	0	2	9	622
11	Do. out of Hameer	Do. ..	4	3	5	2	2	10	613	..		..		..		..
12	Bred at Saidápet out of Sultana I	Do. ..	4	0	5	2	2	8	550	..		..		..		..
13	Red with a large white spot on the face	About 2 years ..	3	6½	4	0	2	5½	268	3	10	4	3	2	10	343
14	Red with small white spot on the face	Do. ..	3	5¼	4	0¼	2	4	271	3	9	4	4	2	8	373
15	White with grey neck and short horns	Do. ..	3	8½	4	1	2	7	308	3	10	4	4	2	7	366
16	White with large horns and grey neck	Do. ..	3	10½	4	5¾	2	8	384	4	3	4	10	2	10	515
17	White bull	Do. ..	3	5¾	3	11½	2	5¾	254	3	9	4	3	2	7	319
18	Large red with two scars on left fore-leg	Do. ..	3	7½	4	4¾	2	10½	322	3	9	4	6	2	10	404
19	Small red bull	Do. ..	3	4½	3	11½	2	5	248	3	8½	4	5	2	7	361

It will be noticed that the imported bulls have increased in total weight since their arrival from 4,501 lb. to 5,789 lb., or an average of nearly 86 lb. a head. The farm bull, of which measurements taken out in May a second time, is now worked on the farm. The other bulls have been sent away.

91. The three cows imported in the second batch were weighed on arrival and again on 2nd May with the following results :—

Cows.	Weight.	Weight.
	February.	May.
	LB.	LB.
White, six years old	372	388
Red, four years old	299	385
White, red face, three and-a-half years old ...	340	371

It will be noticed that the cows increased in weight up to 2nd May from 1,011 lb. to 1,144 lb., or $44\frac{1}{3}$ lb. a head. Several of the cows are far older than they should have been if properly selected. Three of them appear to have been in calf when shipped.

92. The bulls were so young and in such poor condition on arrival that they could not be sent out into the districts for breeding purposes as was intended, and, in fact, will have to be kept on the farm for another year yet before they are fit for that purpose. This will necessitate a considerable expenditure and the growth of little else than fodder crops during the current year.

93. The cattle cost landed in Madras Rs. 2,197-7-3.

94. For a time during the year a Devon bull was standing at the farm, and was used for breeding purposes, but doubts having arisen as to his potency, he was not purchased. Several farm cows were covered by him, but it needs time to show whether with effect or no. If successful, the crosses should be good ones. The Kerry cow has recently dropped a calf apparently by this bull.

95. At present the bull which is chiefly used on the farm is one imported as a calf in 1881 and out of the cow Rani. There is also a Punganúr bull which will be used for crossing one or two Aden cows, with a view to raising a better strain of working cattle than the Aden, without injury to the dairy qualities of the breed. It must, however, be recorded that the farm is far too limited in area for really useful work to be done in breeding good sires for distribution, and the subject is a most important one. During the year ninety-four cows belonging to outsiders were covered by bulls belonging to the farm. No charge is made for this service.

96. The following table shows the daily ration of food issued to the stock during the year. Slight variations were made from time to time, but the following are normal figures :—

——	Working Cattle.	Cows.	Young Bulls.	Calves.	Young Calves.
	LB.	LB.	LB.	LB.	LB.
Ground-nut cake	4	4	3	1	$\frac{1}{2}$
Bran	...	1	...	1	1
Dholl husk	2	2	2	1	...
	OZ.	OZ.	OZ.	OZ.	OZ.
Salt	2	$1\frac{1}{2}$	1	1	$\frac{1}{4}$
	LB.	LB.	LB.	LB.	LB.
Green fodder	15	40	30	20	5
Dry fodder	30	...	...	...	..

97. The general system of management was the same as in previous years. The general health of the cattle was good, although there were three deaths of Aden bulls—two old ones and one, a most unfortunate case, a young promising animal, which died in the Veterinary Hospital of debility. The following table gives information regarding the live-stock maintained, and further details will be found in Appendix III-B :—

——	Average 1876—81.	1882.	1883.	1884.
Live-stock maintained, calculated as country cattle	123·4	76	111	91·6
Stock as country cattle for 100 acres of cultivable land	84·5	63·33	105·7	1114 5
Percentage of deaths.	10·8	4	7·5	4·4
	RS. A. P.	RS A. P.	RS. A. P.	RS. A. P.
Cost of purchased food a head per mensem ...	0 11 7	0 11 0	1 4 10	0 13 2

98. *Working Cattle.*—These are of various breeds—Nellore, Amrat Mahal, Half-breds, Aden, Punganúr—and a large proportion of them are very old and need to be replaced by younger stock. Besides the ordinary cultivating operations of the farm, they were very frequently employed in carting seeds and implements to and from the Saidápet and Salt Cotaur Railway Stations, and the Master Attendant's office. They had also to cart the numerous exhibits received from the different districts for the Calcutta Exhibition, and were also frequently employed in carting materials for estate works.

99. The charge for shoeing the working cattle being 14 annas a pair, it forms a considerable item in the cost of maintenance. The farm cattle are shod monthly, as they have a large amount of work on hard roads. An experiment was made in December to see what the effects of leaving some of the cattle unshod would be. Eight animals of different sorts were left unshod till the end of January, when it was found necessary to shoe two heavy Nellores, and latter on some others employed chiefly in carting. The farm cattle are, however, employed in so many different ways that it is not wise to leave them unshod as the ryot generally does his.

100. *Dairy.*—The following statement shows the yield of milk recorded during the year from all the cows :—

Cow	Sultana I.		Sultana III.		Banu.		Rani.		Hameer.		Baggium.		Lutchmi.	
Breed	Aden.		Aden.		Aden.		Aden.		Aden.		Kerry.		Nellore.	
1	2		3		4		5		6		7		8	
	M.M.*	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.
April 1883.	119	5½	49	2½	85	0	10	2	60	0	135	0		..
May ,,	113	½	49	2½	91	2	86	6	58	7½	136	5		..
June ,,	89	2	48	7	91	5	89	6	44	6	126	4½	87	7
July ,,	42	1	46	4	94	5½	90	3	40	1	128	6	91	0
August ,,	2	1	2	4	99	7	80	5½	39	2	114	4¼	113	4½
September ,,	23	3	..		97	4	79	4	30	2	105	0	97	5
October ,,	82	1	26	½	97	7	74	6	25	0	99	0	97	3½
November ,,	95	2½	64	2½	87	0	66	2	12	1	85	1	93	4
December ,,	118	3	111	3	89	1	27	4½	..		88	5	94	4
January 1884.	112	5½	127	½	79	7	15	3	..		78	7	73	2
February ,,	94	2	119	4	54	3	10	4½	..		53	½	54	3
March ,,	64	5½	116	7	61	7	2	2½	..		9	0	38	0
Total ..	957	½	761	5½	1,030	0½	634	1	310	3½	1,160	1¼	958	1
Calved	13th September 1883.		18th October 1883.		26th February 1883.		1st May 1883.		25th October 1882.		28th October 1882.		18th June 1883.	
Periods not milking— From ..	5th August 1883		3rd August 1883.		..		23rd April 1883.		22nd November 1883.		8th March 1884.		11th March 1883.	
To	19th September 1883.		21st October 1883.		..		4th May 1883, and again from 8th March 1884 up to end of the year.		Date of sale, 7th February 1884.		Close of the year.		20th June 1883, and from sale on 27th March 1884.	

Cow	Seetha.		Brown Aden.		White Aden.		Red Aden.		White Aden.		Grey Aden.		Red Aden.	
Breed	Nellore.		Aden Cows imported 18th January 1884.						Aden Cows imported 12th February 1884.					
	9		10		11		12		13		14		15	
	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.	M.M.	OLL.
April 1883.	24	1	..		..		..		..		..		..	
May ,,	92	7	..		..		..		..		..		..	
June ,,	24	6	..		..		..		..		..		..	
July ,,	78	5	..		..		..		..		..		..	
August ,,	66	5	..		..		..		..		..		..	
September ,,	58	4	..		..		..		..		..		..	
October ,,	56	4	..		..		..		..		..		..	
November ,,	30	2½	..		..		..		..		..		..	
December ,,	10	7	..		..		..		..		..		..	
January 1884	..		21	7	15	4	10	6½	..		..		..	
February ,,	..		64	0	39	6	26	4½	21	2	19	½	16	0
March ,,	..		56	1	65	0	52	1½	81	2½	61	6	45	4½
Total ..	443	1½	142	0	120	2	89	4½	102	4½	80	6½	61	4½
Calved	18th April 1883.		Milked first 19th January 1884 and continued to end of the year.						Milked first 13th February 1884 and continued to end of the year.					
Periods not milking— From ..	30th January 1883.													
To	22nd April 1883 and 22nd December 1883 till sale, 18th January 1884.		....						....					

* Madras Measures, one measure being 100 cubic inches, and eight ollocks being one measure.

Sultana I is the old cow imported in 1874, and continues to do remarkably well. The last milking period, with her eighth calf dropped at Saidápet, ended in August, and the following table shows the yield during the last six milking periods :—

Milking Period began.	Number of Days between birth of each Calf.	Quantity of Milk yielded.		
	DAYS.	MRS.	OLL.	GALS.
Third, May 1877	396	832	3	299·41.
Fourth, June 1878	335	694	1	249·68
Fifth, August 1879	426	831	1	298·96
Sixth, July 1880	427	965	2	347·21
Seventh, September 1881... ...	373	843	1½	304·39
Eighth, October 1882	340	1,024	5	369·54
Average ...	382	865	...	311·58

The yield in this period was therefore the highest recorded.

She produced her ninth calf here on the 13th September, and is still milking, though not so well as in previous years. This calf is a bull and a fine specimen of the breed, and the following figures give some idea of its size; they were taken on 30th May 1883—

Weight 185 lb., height 3 feet, girth 3 feet 3 inches.
Length from the hump to the root of the tail 2 feet.

Sultana III is the cow referred to in paragraph 70 of last year's report, and gave during her first milking period 1,121 Madras measures, or 404·28 gallons of milk ; and calving again on 18th October last, promises to surpass this yield. *Banu* is the second cow referred to in paragraph 71 of last year's report, and yielded milk throughout the year without break ; the amount received since she calved in February 1883 up to 19th May 1884, when she ceased to milk, has been 1,181¾ Madras measures, or 426·2 gallons. *Rani* is another of the cows imported at the same time as the last, but does not appear a very good milker. *Hameer* is the cow which calved on 26th October 1882 (see last report), and has since been sold. *Baggium* is the Kerry cow referred to in paragraph 72 of last year's report, and she continued to yield milk up to 8th March 1884, giving in this milking period 1,775 Madras measures, or 640·16 gallons of milk, a very remarkable outturn. The Nellore cows *Seetha* and *Lutchmi* were referred to in paragraph 73 of last year's report. Both of these cows have been sold, it being necessary to reduce the stock on the farm as far as possible.

The other cows referred to are those recently imported from Aden, and have not been under observation long enough to merit remark, especially as they all arrived in such wretched condition.

101. It is not necessary to enter into detail regarding the cost of keeping these cows, the matter having been so often dealt with in previous reports ; but no one can fail to observe the profitable nature of dairy when fresh milk can be sold freely at 3 annas (say 4*d.*) a Madras measure (100 cubic inches or about 3 pints), and the cost of keeping and feeding a cow is not more than about Rs. 8 per mensem when several are kept and green fodder grown for them.

102. In the following table the results of some cheese-making experiments carried out in August last with the milk of the Kerry cow are given. The coagulant used was fresh leaves of the Prayam (*Epicarpurus orientalis*). The milk used was in every case from the morning milking and was not heated. To every lot of milk a tea-spoonful of boroglyceride was added. The weight applied in pressing was in every case 56 lb. The value of the milk used was Rs. 1-13-3, and the cheese would thus cost, without paying for labor, &c., about 9 annas per lb. :—

Date.	Quantity of Milk used.	Number of Leaves used.	When applied.	When curdling finished.	When put under Press.	When removed from Press.	Quantity of Cheese obtained.
	MADRAS MEASURES.		A.M.	P.M.	P.M.	A.M.	OZ.
20th August 1883	$1\frac{7}{8}$	30	7-17	3-2	6-15	6	9
21st ,, ,, ...	2	32	7-2	2-18	6-2	6	11
22nd ,, ,, ...	2	32	7-5	2-30	5-40	6	11
23rd ,, ,, ...	1-$7\frac{1}{2}$	31	6-49	2-13	5-45	6	$10\frac{1}{2}$
24th ,, ,, ...	1-$7\frac{1}{2}$	31	7-7	2-15	5-40	5-50	$10\frac{3}{4}$
Total ..	$9\frac{3}{4}$	..	..	..	..	..	$52\frac{1}{4}$

This cheese all failed to keep and turned sour in a few days and putrified shortly after, the amount of boroglyceride being apparently insufficient to preserve it.

103. The juice of this plant (Prayam) was compared with berries of the *Withania coagulans* and some English Rennet extract as a coagulant during the year, as follows :— To 5 ollocks of milk (drawn at 6-15 A.M.) heated to the boiling point and cooled, 25 grains of Withania coagulans seed powdered was added. To another 5 ollocks dried Prayam juice was added. To another 5 ollocks the fresh juice of 32 Prayam leaves. The coagulants were all added at 10-15 A.M. The milk treated with the fresh Prayam juice was well curdled at 12-45, whereas that milk to which the Withania coagulans seed had been added was only viscid, and that to which the dry Prayam juice had been added showed no material change even at 1-30 P.M., and by that time the coagulation of the milk to which the fresh Prayam juice had been added was complete. Dry Prayam juice, in fact, caused no coagulation. The milk treated with it was not fully curdled till next morning, and this was probably due to natural fermentation.

To $4\frac{1}{2}$ ollocks of raw milk the juice of 16 Prayam leaves was added at 10 A.M., and to another $4\frac{1}{2}$ ollocks five drops of Rennet extract. Both the samples of milk were curdled at 12-30 P.M. It was not ascertainable which of the samples had coagulated most quickly. Three ounces of cheese were obtained from each lot of milk. It thus appears that the juice is equal to Rennet and superior to the seed of the Withania coagulans.

104. Large quantities of the juice can be collected, but if kept for a time it loses its coagulating power, and it is only when the leaves of the plant are plucked and their juicy ends dipped directly into the milk that satisfactory results are obtained.

105. *Sheep.*—Unfortunately the service in August 1882 of the half-bred Southdown rams purchased in 1879 was ineffectual, and only five lambs were dropped at the usual season in 1883 ; consequently two farm-bred rams were put with the ewes in February and September 1883, and in all fifty-three lambs have been dropped during the past year, most of them between July and November. It is hoped that it will be possible to return to the usual season this year. Nearly 50 per cent. of the lambs were born in October and November, when the weather was very bad, and yet there was little mortality among them, as they were carefully housed and the ewes were not allowed to graze on the rank grass grown during those months. The whole flock was very healthy during the year.

106. The following statement gives the strength of the flock and the losses compared with the same figures for previous years :—

—	Average, 1873—77.	Average, 1878—82.	1883.
Average number of flock ...	247	173·8	108·6
Number of deaths	20·6	48·2	4
Percentage of deaths ...	8·40	27·70	3·6
Rainfall	48·32	48·27	66·10

107. During the year the following rams were sent out into the districts for breeding purposes, the farm receiving no credit for their value :—

District.	To whom sent.	Number.	Date.
Kurnool	Tahsildar of Sirvél ...	2	2nd April 1883.
Madura	Sub-Collector	2	3rd September 1883.
Do.	Tahsildar of Nelacottah ...	1	3rd " "
Do.	Collector	3	17th October 1883.
Do.	Do.	1	11th February 1884.
North Arcot	Agricultural Association ...	2	17th November 1883.

108. The flock was shorn between 29th March and 22nd April last, and the yield of wool obtained was satisfactory as the following table shows :—

Number.	Ages.	Rams.		Ewes.		
		Average Weight.	Average Yield of Wool.	Number.	Average Weight.	Average Yield of Wool.
		LB.	LB.		LB.	LB.
2	Lambs	...	Not shorn.	None.	...	...
21	Lambs, six months ...	30	1·0	23	28·3	·81
5	Shearlings	43·2	1·4	None.	...	...
5	Two Shear	76·4	2·5	17	51·6	1·40
5	Three Shear	83·4	2·7	17	64·1	1·80
1	Aged	144	3·4	21	70	1·5
37	Average ...	48·3	1·6	78	52·5	1·3
Average of 115 sheep of all ages excepting two lambs					51·2	1·42

This table may be compared with that recorded in 1877 (page 83 of the Saidápet Farm Manual), but it must be noted that lambs form 38 per cent. of the number shorn, and most of these were barely six months old, whilst in 1877 their place was taken by shearlings over one year old. The yield of wool for every 10 lb. of live weight was 4·4 oz. against 4·95 oz. recorded in 1877, and the following table shows the yield in this way by the sheep of different sexes at various ages :—

Sex.	Lambs.	Shearlings.	Two Shear.	Three Shear.	Aged.	Average.
	OZ.	OZ.	OZ.	OZ.	OZ.	OZ.
Rams	5·3	5·1	5·2	5·1	3·7	5·3
Ewes	4·5	...	4·3	4·4	3·4	3·9

It must be remembered that the Saidápet breed is primarily indigenous, improved solely by selection till 1879, when the half-bred Southdown-Mysore rams were purchased. The remark made above regarding the want of land for more extensive cattle-breeding applies equally to sheep-breeding, and until breeding can be carried on on a larger scale, the work of the department in distributing rams must remain limited and cramped, and of little value. Rams should be distributed not by tens or dozens per annum, but by hundreds to do much good.

Implements, Machines and Tools.

109. *Ploughs.*—A considerable amount of attention was given to various forms of ploughs during the year. On the farm many forms were in use, and it was found

that the Swedish ploughs answered very well for cultivating the irrigated land for paddy on the "puddling" system. In this work neither the regular farm laborers nor men sent from the districts to be trained found any difficulty. An experiment was made to compare the work done by one of these ploughs with that of a country plough (so called), the land having just been supersaturated with water. The cattle used very nearly similar, and those yoked to the Swedish ploughs worked apparently just as easily as the others. The work done was a furrow 6″×8″ by the Swedish plough with a wheel at a draught of 2 cwts., and a furrow $5\frac{1}{4}''$ deep × $7\frac{1}{4}''$ at the top and $12\frac{1}{2}''$ at the bottom by the native plough with an approximate draught of $1\frac{1}{2}$ cwts. There is considerable difficulty, however, in testing the draught of ploughs with fixed poles. By using these ploughs the ploughing was done very speedily, though the work of the cattle was frequently stopped by heavy rain in October and November; 16·65 acres of irrigable land having been prepared for paddy in sixty-seven days' work of a plough, and of this about 4 acres had to be prepared twice over owing to the seedlings first planted having failed. At this rate a pair of cattle working daily with this plough would finish 8 acres of such land in a month even under the disadvantageous conditions experienced during the year.

110. *Improved Country Ploughs.*—It was the complaint of a Mirasidar of the neighbourhood who purchased a number of these ploughs during the year that they were out very rapidly. Some ploughs with steel shares and mould-boards were made for him, and he has since been quite satisfied with their durability. The cost of this modification was about Rs. $10\frac{1}{2}$ per plough.

The demand for these ploughs was very considerable, as will be seen by a reference to the table of ploughs distributed.

111. The following extracts from reports on different trials of ploughs are given as being of general interest. The first trials were made early in October, with the following results :—

Plough.	Furrow. Depth in	Furrow. Width in	Soil moved in each 100 feet of furrow.	Draught.	Efficiency.	Remarks.
	INCHES.	INCHES.	C. FT.	LB.		
Ransome's R. H. A.	$5\frac{1}{4}$	11	40·1	280	698	The plough, therefore, that did the best work is the W. S. R. A. W., whilst Massey's C. S. did not show up well, the draught being too great. Plough W. M. S. is too small to compare fairly with the others.
Do. W. S. R. A. W. ..	5	$10\frac{1}{2}$	36·5	196	537	
Do. W. M. S.	4	8	22·2	168	756	
Do. K. W. S.	$4\frac{2}{3}$	$9\frac{1}{2}$	30·8	244	796	
Massey's C. S.	$5\frac{1}{2}$	10	38·2	308	806	
O. B. 29 B.	$4\frac{1}{2}$	9	28·75	202	703	
O. B. 29 A.	$3\frac{3}{4}$	10	26·00	244	939	

"The most striking result of these trials is the difference between them and those obtained last season with Messrs. Ransome's ploughs; regarding K. W. S. this is not surprising, for before it was tried without a wheel, but the others then showed the following figures of efficiency :—R. H. A. 546, W. S. R. A. W. 647, W. M. S. 674, and the O. B. 29, B. only 478. The work done in those trials was, however, generally deeper; in these I aimed at a depth of 5″ and a width of 9″ in the furrows. These trials were made in field No. 32 on the 10th instant, and the soil was soft and easy to work.

"2. Regarding Messrs. Massey's ploughs, I have to report that the lower position of the C. S. pattern is, I believe, due to formation of the mould-board, which together with the share has not been turned out well. The plough is made up as follows :—

Beam—simple with bridle after K. W. S. and therein defective.

Stilt—one with two handles, which are far too weak.

Body and slade—cast, rivetted together.

Share—7 inches long, wrought-iron.
Mould-board—set 9 inches wide, wrought-iron. } Both bolted to the body.

Wheel and standard after pattern in O. B. 29 B.

Weight of plough, 79 lb.

"By the removal of the defects noted a useful style of plough would be turned out. It cleaned its furrow thoroughly.

"3. I was unable to test the draught of the other two ploughs received from Messrs. Massey and Co., for it is impossible to do so properly with ploughs of their nature, *i.e.*, with a fixed shaft; but I may draw your attention to the undesirability of such an arrangement as being mechanically wrong, for the cattle in drawing such a plough must have a heavy pressure on their fore-quarters to bear in addition to exerting the force required to draw the plough through the soil. The arrangement, however, suits native prejudices, and this may possibly compensate for the loss of power.

"4. Plough **C. P.** weighs 39 lb., and is made as follows:—

Beam—none, but fixed pole or shaft of gas piping substituted. In the pattern tried, this pipe had a bend in it in the wrong place.
Body—cast-iron bolted on to pole.
Share—6 inches wide. } Wrought-iron and rivetted to body.
Mould-board—set 9½ inches. } Wrought-iron and rivetted to body.
Slade—cast-iron, rivetted to body.
Stilt—after country plough style, made by extension of pole pipe.

"This plough did not do good work, and was difficult to manage well. The mould-board is set too wide, and the share is also too broad. It cannot plough more than 4 inches deep, and the weeds catch in the angle between the body and pole and form an obstruction in ploughing.

"Plough B. P. weighs 48 lb., is made much the same as the C. P., but larger. Materials the same—

Share—7 inches wide. } These are rivetted to the body, and are too wide for the depth the plough can go. The share also is bad in form.
Mould-board—set 10 inches wide.
Stilt—single with handle after. O. B. plough No. 29.

"This plough did fair work, and is better formed than C. P. Both the above ploughs are fitted with a hook clamped on to the pole to hold the yoke. The hook can be moved up and down the pole according to the height of the cattle and the work to be done; but the clamp, which is tightened by a screw and nut, I cannot regard as a good arrangement, and must be very liable to get out of order in common use."

112. As it was considered that the results given in the above table were obtained under conditions unfavorable to the good working of the Swedish ploughs O. B. 29-A and 29-B, a further trial was made at the end of the same month and was reported on as follows:—

"I have the honor to give below the results of some further trials of the ploughs made last week in No. 12 field; in this case the depth aimed at was 6 inches, but none of the ploughs worked really well:—

Plough.	Furrow.			Draught.	Efficiency, depth 6″.	Efficiency at previous trial, depth 4″.	Efficiency at Mr. Schiffmayer's trial, depth varied.
	Depth.	Width.	Soil moved in 100 feet.				
	IN.	IN.	C. FT.	LB.			
R. H. A.	6	10	41·6	336	800	698	546
W. S. R. A. W.	6	10¼	42·7	280	656	537	647
K. W. S.	5¼	8	29·2	280	959	796	* 730
O. B. 29-A	5½	9	34·4	308	895	939	Not tried.
O. B. 29-B	6	10¼	42·7	448	1,049	703	478
C. S.	5½	9	34·4	280	811	806	Not tried.

"The results of this trial are no more conclusive than those of the previous ones, but the figures of efficiency show roughly the force required in each case by each plough to turn over 1 cubic foot of soil to the depth given. The real efficiency and superiority of the ploughs do not, of course, depend on this alone. I do not understand why in the last trial the Swedish ploughs worked so badly, and further trials will be necessary, and I shall conduct them when opportunity offers. I may, however, remark that for ordinary field work a depth of 4 or 5 inches is that at which ploughs should work best.

"I excluded the plough W. M. S. in these trials, as 6 inches is above its capacity.

"In Mr. Schiffmayer's trial the plough W. S. R. A. W. worked 7¾ inches deep and 11¼ inches wide, and the 29-B only 5⅓ inches deep and 9·6 feet wide, and it is well known that the deeper a plough runs the greater will the draught be in proportion. In these trials, however, the R. H. A. (or B. F. I.) did nearly the same work as the No. 29-B."

* Without a wheel.

113. Messrs. Massey and Co., having improved some of their ploughs, a further trial of them was made at the end of January, when the following report was submitted by Mr. Benson :—

"The ploughs submitted for trial were four by Messrs. Massey and Co., viz. :—

B. P., a light plough with head wheel.
D. P., a fixed pole plough—a copy in iron of the Saidápet Improved country plough.
C. P., a fixed pole plough, right hand.
C. P. B. (not marked), the same as C. P., but with a left-hand mould-board.

"The plough B. P. is a neat and light implement, but the specimen sent for trial was so badly set up that it could not be properly tried. The beam had a decided bend in it, which prevented the plough from running true. The stilt also was not straight or set true to the body.

"D. P. worked well when a considerable pressure was exerted on the stilt. This is not as it should be The plough possesses the bad points of the "Improved country" pattern in the share being badly formed and unduly large, and the mould-board too abrupt. The use of a little more metal in the mould-board would not add much to the cost of the plough, and would allow of a better curve being given to it.

"C. P., working 3 to 4 inches deep, turned and laid the furrow well, and was easy to manage. The point of the share is too near the heels of the right-hand bullock as he walks in the furrow and apt to strike them. The arrangement for moving the body of the plough along the pole, for the purpose of increasing the depth of work, did not appear to be of much use, as when tried it had little effect in this respect, unless great pressure was used.

"C. B. P. The specimen sent was more difficult to get into working order than the C. P. pattern. It did about the same work, but not so well, and needed pressure to keep it steady in the ground. Our drivers found it more difficult to manage, possibly in part from the novelty, but really I believe because the position is not so convenient. They object to walking on the unploughed land, as it often is covered with thorns, stubble, stones, &c., and they also assert that it cannot be so conveniently kept clear of weeds and adherent soil as the right-hand ploughs. Altogether, as yet, I do not see the advantages of the arrangement, nor what ultimate benefit it can confer; possibly with raw hands it may be as easy to work as the right-hand plough, but it is certainly undesirable to have the two systems unless this left-hand arrangement has anything to recommend it."

114. Mr. Weld, Sub-Collector of South Arcot, raised some points regarding the efficiency of the Improved country plough during the year, which became matters for discussion. They were that—

"*First.*—The wooden stilt is 1 foot too long.
"*Second.*—The mould-board should be on the left-hand side of the plough instead of on the right as at present.
"*Third.*—The draught of the plough is far too heavy for ordinary country cattle.
"*Fourth.*—The clamp with nuts which holds the plough together is altogether objectionable, as the nuts come off the screws and the plough falls to pieces.

As Mr. Kistnasawmy Moodeliar of Shiyáli had had great experience in working these ploughs, his opinion was asked on these points, and the following is his reply :—

"To the first of the questions. To open straight furrows the ploughmen must hold the handle in the stilt by his two hands firmly without leaving it to incline towards either side. The present length of the plough is $2\frac{3}{4}$ feet, and when reduced by a foot, that is, to $1\frac{3}{4}$ feet, it becomes too short; men of average height would find it difficult to work with it, and the work turned out will not be as efficient and perfect as the present plough. None of the workmen had made this objection hitherto; I therefore think that no alteration is necessary in the stilt of the plough.

"To the second. Before transferring its present position the advantages and the disadvantages arising from it should be considered. The advantages are that the drivers can remove without difficulty the clay or mud adhering to it by his right foot; he can have easy control over the cattle. As the laborers when at work are habituated to use more freely and easily the right-hand part of the body, they are facilitated in every way to work with it. The only disadvantage is that the cattle employed in it are not accustomed to work in the direction required; but they can be trained in a few days, and it is quite necessary that they should be so trained up, because they might be engaged in carts when they should fit to the directions of the drivers. Moreover, we do not see the mould-board attached to the left side in any of the ploughs of other civilized countries. This objection has been put forth by some of my superintendents and neighbouring Mirasidars, and I have answered them in the manner stated above. No such difficulty has afterwards been experienced. I therefore think it advisable not to take any trouble in a work where the need of it has been slight and easily met with by other simpler ways.

"To the third. I should explain that the draught of the ploughs is not 'far too heavy' as Mr. Weld considers, but it is a little heavier than the ordinary plough. (I have not provided myself with an instrument to find out accurately the comparative weights in the draught of ploughs). This increased draught is justifiable when the work turned out by improved and

ordinary ploughs is considered. To work an improved plough a little better cattle and driver are required. What I have done in my estate is this: if the price usually paid for a pair of ordinary country cattle working primitive ploughs is from Rs. 20 to 30, I have purchased cattle worth from 50 to 60 rupees a pair, and I have directed my attention in keeping them under proper care. All the cattle of my estate are obtained from Trichinopoly and South Arcot Districts. They work very well without undergoing any difficulty.

"The fourth question is that the clamp with nuts serves two purposes: it not only holds the several parts of the plough, but is useful to regulate its position when cattle of different size are yoked to it. I think it is not objectionable until some improvements are being made to effect the above regulation. In my experience I have found out that the nuts do not come off the screws often and often; when properly cared, they require to be replaced only twice in a year.

"In conclusion, I would give as my opinion that among the several ploughs experimented by me the wooden stilted improved country plough is found to be the best to be introduced in the place of the country plough. It is further distinguished by its light draught, simple construction, and moderate price. In a ploughing season it does four times the work of an ordinary plough. It has been met with favor among several Mirasidars in my locality."

115. Mr. Robertson recorded the following opinion regarding the placing of the mould-board on the left side of the ploughs:—

"I see no reason why a plough with a left-hand mould-board should not be constructed if it really is wanted. The mould-board of the ordinary turn-wrest plough is worked both as a left-hand and as a right-hand mould-board to suit the ploughs of hilly districts, and a specimen has been at the farm for ten years or more. But I do not admit that a left-hand mould-board is a necessity even for a plough built similar to the ordinary country plough. It is quite true that a lazy ploughman when following a country plough generally walks with his plough on his left and his left hand on the handle, but the full working capacity of the plough cannot be utilized when it is so handled unless the soil is extremely light and friable. Ordinarily a good ploughman will have his plough in front of him and will generally use both his hands on the plough handle except occasionally when the cattle need to be made to walk faster. Mr. Krishnasawmy Moodeliar of Shiyáli has introduced on his estate upwards of 100 improved country ploughs, all with mould-boards on the usual side, and when I saw his men employed, they worked the improved plough as easily as the ordinary country plough."

116. Mr. Weld also sent a plough constructed by him by placing a rough share and mould-board on the ordinary country plough frame to be tried at Saidápet, and the following is Mr. Benson's report on the subject:—

"I have the honor to report that I tried the plough referred to in field No. 16, the soil being in a free state for ploughing, and Messrs. Massey's ploughs working well.

"Mr. Weld's plough did much better work than the country plough, but it failed to cut a clean furrow slice, and left a good deal of the soil unmoved; so much so as to necessitate two ploughings to get as good an effect as that obtained with Massey's C. P. in one. In the absence of information as to the cost of the modifications, I am unable to express an opinion as to the value of them, but it seems to me that it will be mere waste of time and money to go back so far again in plough-making as this pattern takes us."

117. Simple modifications like this were experimented with on the farm many years ago, and will be found referred to in the report for 1873.

118. Towards the latter end of the year the following implements and machines were received from England:—

	Price in England including packing. £	s.	d.	Price delivered in Madras. RS.	A.	P.
For Mr. Krishnasawmy Moodeliar, Shiyáli—						
3 Dressing machines	28	13	3	356	0	0
1 Cake-crusher	4	15	3	59	0	0
And for the farm—						
1 Winnowing machine	8	5	6	103	0	0
1 Set Howard's ryots' implements	8	11	9	107	0	0
1 Simplex horse-hoe	4	18	4	61	0	0
1 Set of iron harrow	3	8	1	42	0	0
1 Seed drill	6	3	2	77	0	0

The cake-crusher was tested on the farm and was found to break 274 lb. of ground-nut cake in 35 minutes, or at the rate of 4,200 lb. in a day of nine hours. It required two men to work it, and the cost of crushing 1,000 lb. of cake would be about $1\frac{1}{2}$ annas.

Howard's set of ryot's implements consists of the following :—

1 Small plough, dead weight, 33 lb.
1 Do. grubber, 2 tines, dead weight, 33 lb.
1 Do. do. 3 do. do. 34½ lb.
1 Do. bullock-hoe, 8 tines and double mould-board, dead weight, 35½ lb.
1 Do. double mould-board plough, dead weight, 31 lb.

These implements were tested in February, but the conditions were so unfavorable as to render it useless to record the results. The implements are strong and light, but little control is given over them by the stilts being upright and single.

The Simplex horse-hoe and set of iron harrows will prove useful implements. One thing must be noticed in regard to these implements is the excessive cost of packing charged in England, in many cases changing an apparently low-priced article into a very expensive one.

The seed drill seems likely to be very useful; it is simple and strongly made, and adjustable for sowing at any desired width. A plot measuring about 304 square yards was sown with it in about 15 minutes, or at the rate of $5\frac{1}{2}$ acres per diem. The draught was so little that it could not be determined by the dynamometer, and two coolies worked the drill easily alone. One man could sow small areas with it alone. The daily charge of such a machine is more than recouped by the superiority of the work done by it. The machine will be more fully tested in the future.

119. The work done in distributing implements has already been referred to in another part of this report.

MISCELLANEOUS.

120. *Model Farming.*—As far as this is understood to mean "Commercial" farming, nothing was done during the year, but of course as an example no better model than an experimental station or farm can be found. It is understood that all idea of attempting "Commercial" farming in any way has been given up.

121. *Accounts.*—The following statements refer to the transactions of the year. The comparative valuation statement will be found in Appendix IV :—

Cash Account for 1883-84.

Receipts.	RS. A. P.	Expenditure.	RS. A. P.
Capital advanced by Government during the year	4,104 0 6	Establishment	1,387 8 0
Implements and machines	5,644 15 7	Cooly labor	3,228 2 11
Live-stock	2,109 10 0	Implements and machines	3,611 13 7
Crops	2,719 4 6	Live-stock	1,817 10 8
Sundries	189 1 3	Seeds	372 0 0
		Manures	475 15 6
		Despatching seeds	1,251 9 11
		Contingencies	415 1 0
		Aden stock	2,207 2 3
Total ..	14,766 15 10	Total ..	14,766 15 10

Profit and Loss Account.

Establishment	1,389 8 0	Implements and machines	3,793 3 6
Despatching seeds	1,251 9 11	Crops	443 4 5
Labor	640 2 10	Capital for balance of loss *	557 2 9
Live-stock	1,283 5 8		
Sundries	229 0 3		
Total ..	4,793 10 8	Total ..	4,793 10 8

* This represents the cost of the farm for the year, including that of distributing seeds for the department generally.

Balance Sheet on 31st March 1884.

Liabilities.	RS. A. P.	Assets.	RS. A. P.
Due to sundry persons	412 3 4	Due by sundry persons	602 12 0
Capital	29,472 8 8	Valuation for 1884	29,282 0 0
Total ..	29,884 12 0	Total ..	29,884 12 0

In looking at these accounts, it must be remembered that the farm received a credit of about Rs. 2,500 for Swedish ploughs sold, not originally paid for by it, and also that it received no credit for the stock distributed. The large expenditure of the year was due to three causes—(1) demand for implements, which was covered by receipts from sales; (2) distribution of seeds, not properly a farm charge; (3) importation of Aden stock, nearly covered by the value of animals.

SERICULTURE.

122. On the 13th December 1883 two cases (Nos. 2 and 3) of silk-worm eggs were received from the Government Office, and one (No. 1) direct from the Post Office, all three originally from Dehra Dun. No intimation has been received as to the varieties sent.

When received all the cases contained some worms which had hatched out and some which had died from starvation, but case No. 3 the fewest, and, as far as could be judged, the eggs were in good condition. The following statement shows the amount of eggs received and how they were disposed of:—

Case.	No. 1.	No. 2.	No. 3.
	oz.	oz.	oz.
Amount received	7	5¾	8½
Issued to Eurasian Association	2½	2½	...
Do. Dr. Shortt	1	...	...
Do. Major Pickance	2	...	...
Do. Collector of North Arcot	...	...	4
Do. Dr. Bidie for a Ceylon planter ..	...	...	0½
Retained at Saidápet	1½	3¼	4

The contents of each box were placed in a separate bamboo tray 2′ × 2′ lined with thick paper. The eggs were spread as thinly as the space permitted, and mulberry leaves were strewn over them every morning and evening. The worms, as they hatched out, were transferred with the leaves to other trays bearing the corresponding number and date, and leaves were then loosely spread over both the worms and eggs. The hatching proceeded slowly till the 27th December, but after that date the leaves in the egg-trays were found every morning and evening, till the 6th January, covered with numbers of worms which have consumed the parenchyma, leaving only the ribs of the leaves. The eggs of No. 1 set had all hatched by the end of December, but some of the eggs in Nos. 2 and 3 were still unhatched even in February. When the experiment was closed, about 1 per cent. of the eggs in No. 3 might have remained unhatched.

123. Eighty-four trays were provided for the worms, and these were arranged in three tiers, one above another, on wooden stands each measuring 15′ × 2′. Eight such stands were in use. Afterwards, when more space was required, date mats were placed across some of these stands so as to form a sort of shallow basin, in which the worms were placed instead of in trays, the trays being removed and placed on tables, &c. About 480 square feet of space in all was provided. The legs of some of the stands were provided with water-troughs to keep off the ants; those of others and of the tables were smeared with castor and kerosene oil respectively. The last plan was found to answer well, but as the experiment lasted a long time and oil would have been expensive, earthen water-trays were purchased and used.

The house in which the experiment was conducted was spacious and airy and protected from draughts, and the door-ways were covered with double wire-netting to exclude rats, squirrels, &c.

124. The following is a statement showing the character of the weather during the time of the experiment as shown by the Observatory records:—

Date.	December 1883. Thermometers. Mean.	Maximum.	Minimum.	Humidity.	January 1884. Thermometers. Mean.	Maximum.	Minimum.	Humidity.	February 1884. Thermometers. Mean.	Maximum.	Minimum.	Humidity.	March 1884. Thermometers. Mean.	Maximum.	Minimum.	Humidity.
				CTS.				CTS.				CTS.				CTS.
1st	..	..	..	..	73·8	80·5	68·6	81	70·5	82·6	61·8	78	76·2	86·1	67·9	75
2nd	..	..	..	..	74·2	81·6	69·8	84	72·6	82·4	62·4	77	75·0	85·4	66·0	79
3rd	..	..	..	..	74·5	81·1	67·6	76	74·3	84·2	65·4	72	74·9	85·6	66·2	75
4th	..	..	..	..	72·6	76·2	70·6	88	71·7	83·6	62·6	76	76 1	87·8	66·2	79
5th	..	..	..	..	76·8	83·9	71·4	86	70·5	82·5	62·2	76	76·7	87·4	67·5	78
6th	..	..	..	..	76·4	83·6	72·4	84	69·7	83·8	59·8	75	76·8	86·8	66·7	82
7th	..	..	..	..	74·0	81·2	68·2	81	69·7	84·7	59·4	77	76·6	87·4	66·9	82
8th	..	..	..	..	72·7	80·8	66·4	74	71·2	82·7	61·6	79	76·7	85·4	68·0	80
9th	..	..	..	..	72·6	81·2	63·9	76	73·1	82·5	64·4	83	78·4	88·4	68·6	79
10th	..	..	..	..	73·3	82·3	63·7	63	75·2	86·0	67·0	81	78·1	88·6	67·7	76
11th	..	..	..	..	74·1	82·7	67·0	62	75·0	84·1	67·6	84	77·8	88·2	69·4	75
12th	..	..	..	..	72·8	81·3	65·2	65	75·3	84·9	67·2	72	..	..	..	..
13th	..	..	..	..	71·3	82·0	63·4	75	74·5	83·2	66·3	80	..	..	..	..
14th	..	..	..	..	71·4	82·0	61·4	72	75·2	84·0	67·6	81	..	..	..	..
15th	..	..	..	..	72·5	83·1	63·2	74	76·9	86·6	69·4	83	..	..	..	..
16th	..	..	..	..	74·0	83·4	66·4	75	79·3	90·4	73·0	78	..	..	..	..
17th	75·3	82·4	70·6	88	76·5	83·2	71·4	84	78·2	85·4	71·4	82	..	..	..	..
18th	76·1	83·2	69·6	77	76·7	83 4	71·4	86	76·8	85·8	70·2	79	..	..	..	..
19th	75·5	81·7	71·2	71	76·2	84·1	72·5	85	76·1	85·6	66·5	73	..	..	..	..
20th	73·9	81·3	70·4	71	74·6	80·6	68·4	88	74·6	85·4	66·5	71	..	..	..	..
21st	73·2	78·3	69·6	72	74·4	81·3	69·6	85	73·7	83·7	64·5	78	..	..	..	..
22nd	72·4	80·6	65·5	74	72·6	82·5	65·0	78	75·7	85·6	66·4	78	..	..	..	..
23rd	72·9	80·6	65·4	72	74·0	82·4	65·6	70	77·1	85·8	68·6	77	..	..	..	..
24th	74·7	81·0	69·6	74	72·3	83·0	65·9	78	77·2	86·0	68·0	74	..	..	..	..
25th	73·4	79·6	69·0	81	72·0	82·3	64·7	78	76·7	85·7	67·0	75	..	..	..	..
26th	73·0	80·9	67·8	75	73·2	82·8	64·9	72	75·1	85·2	66·2	79	..	..	..	..
27th	71·1	79·6	63·7	73	73·4	82·3	65·4	78	75·6	86·1	67·6	81	..	..	..	..
28th	69·4	79·6	61·4	77	73·1	82·9	65·4	74	76·5	87·3	68·2	78	..	..	..	..
29th	67·7	78·3	62·4	81	72·8	83·4	62·6	68	77·2	88·6	68·5	77	..	..	..	..
30th	73·0	78·4	66·4	79	71·4	83·3	62·6	71	..	..	..	..	..	..	..	..
31st	73·0	79·1	68·0	78	70·6	82·2	60·7	78	..	..	..	..	..	..	..	..

Till the second week of January the weather appeared to be very favorable, the mean daily temperature being 73·5 degrees and the mean daily range being 14·6. It must have been very unfavorable in the last week of February and in March, as the temperature was high in the day and very low in the night, the mean daily range being 19·20. To keep the temperature down whenever it happened to rise too high the floor of the rooms was covered with sand on which water was frequently sprinkled.

125. The trays were cleaned daily, one tray being always kept empty for cleaning purposes. The worms were lifted up together with the leaves last supplied, on which, of course, they were found and transferred to the extra tray, and the rejected leaves and dirt having been removed, they were again put back in the cleaned tray and fresh leaves supplied. The worms then got upon the fresh leaves and the old leaves were removed next day as before.

The worms were fed every morning and evening, but it seems that they received too large a quantity of leaves at a time, and thus many of the leaves were spoiled and rejected, but it would have been too expensive to have fed them just as the leaves were needed. Care was taken that the leaves should be dry when supplied. At the commencement of the experiment very finely chopped leaves were given, but it was then very difficult to clean the trays properly. The leaves also apparently dried and shrivelled sooner than when given whole.

126. Until the 22nd January abundance of leaves were available in the Botanical garden, and afterwards till the 28th they were purchased from gardens in the neighbourhood, and then the Madras Municipality furnished a supply till the 9th February, which failed afterwards, and great difficulties were experienced in obtaining enough to feed the worms, though supplies were received from the Monegar Choultry, Guindy Park, and Chenapatam (Mysore), whilst by this time a small quantity was again being produced in the Botanical garden, and in the meantime the stock of worms had been much reduced.

127. The amount of leaves supplied to the worms daily was approximately as follows:—

	LB.
From 13th to 15th December 1883	2
,, 16th to 22nd ,, ,, ...	4
,, 17th December 1883 to 7th January 1884	10
,, 8th to 12th January 1884	20
,, 13th to 18th ,, ,, ...	40
,, 19th to 22nd ,, ,, ...	50
,, 23rd to 28th ,, ,, ...	100
,, 29th January to 9th February 1884	100
,, 10th to 11th February 1884	50
,, 12th to 23rd ,, ,, ...	100
,, 24th February to 11th March 1884	20

The total amount supplied being about 3,800 lb., of which 1,160 lb. was produced on the farm. This quantity of leaf would not much more than have sufficed for the worms hatched from the $2\frac{1}{2}$ oz. of eggs asked for, whereas $8\frac{3}{4}$ oz. of eggs were received and hatched out. It would have been better had the hatching been stopped, or a number of the young worms destroyed, instead of attempting to rear so large a number, but no fair estimate of the amount of leaves available on the farm and elsewhere was possible, and towards the end of January and at the beginning of February the consumption was very great.

The leaves which were supplied from the Municipal Garden and Monegar Choultry enabled most of the worms which had hatched in December to reach maturity, and they spun fast, about 600—900 cocoons a day being obtained from the 2nd to 26th February.

128. There were very few deaths amongst the worms till the 21st February, but about this time leaves were only available from the Botanical garden at the rate of about 20 lb. a day, and the worms died off in large numbers after the 24th till the end of the month. The deaths chiefly occurred amongst the big worms, which were ready to spin, and which at the time required a large supply of food. On the 22nd

and 23rd the Deputy Superintendent who was in charge of the experiment was otherwise occupied, and there may have been some want of attention, but it is greatly to be regretted that the supply of leaves failed just as the large number of worms which had hatched out between the 27th December and 6th January were near the change. All the dead worms were promptly removed and the trays cleaned. The stock of worms was so much reduced by the 27th February that the supply of leaves from the Botanical garden alone was more than sufficient. No deaths occurred among the worms in March. It is highly probable that the high temperature and short commons combined were the chief cause of the mortality. The big worms which survived never apparently quite recovered from the effects of the previous starvation. As there were so few worms left, and it was not worth while going to further expense in the experiment, it was resolved on the 11th March to turn those remaining out on the mulberry trees in the Botanical garden. The worms disappeared entirely in two days, being probably for the most part devoured by birds, lizards, &c.

129. On account of the scarcity of mulberry leaves, some experiments in feeding the worms with the leaves of the following plants were made:—

Botanical Name.	English Name.	Vernacular Name.
Tectona Grandis ..	Teak	Teakku maram.
Terminalia Catappa ..	Country almond ..	Vathumai.
Zizyphus Jujuba ..	Country apple	Elandai.
Ricinus Communis ..	Castor-oil plant ..	Amanakku.
Carissa Carandas ..	....	Kala chedi.
Guazema Tomentosa ..	Bastard cedar or toon tree.	Thenpuchi maram.
Ficus Racemosa ..	Country fig	Athi maram.
Ficus Religiosa ..	Peepul tree	Arasa maram.
Odina Wodier	....	Othia maram.
Anogeissus Acuminata.	....	....

The worms only got upon these leaves, but refused to eat them, and, when a mulberry leaf was offered to them, it was very greedily consumed.

An experiment was also made to induce the silk-worms to feed on lettuce leaves, on which certain varieties of the domesticated worm are known to feed. The leaves were rejected, and the worms which were put upon the leaves eventually died of starvation.

130. On the 26th February an experiment was made with 200 big worms which were about to spin, in order to ascertain the quantity of leaves which they were in that stage capable of consuming. The leaves were supplied sparingly and frequently, so that there might be no waste at all. About $\frac{3}{8}$ ounce of the leaves was consumed in a day by them. At this rate 30,000 worms, which number may be produced from an ounce of eggs, would require in the same stage about 3 lb. of leaf; but it must be remembered that the experiment was made after the worms had begun to die off, and it is probable that the same worms would have consumed much more at an earlier date. These worms all died and did not spin.

131. On the 11th January the first worm spun its cocoon; it was then $2\frac{1}{2}$ inches long and about $\frac{1}{4}$ inch thick, and was one of those which had hatched out before the eggs were received here. The trays containing the big worms,* as well as the stands furnished with date mats, were fitted up with casuarina branches, so that worms might construct their cocoons upon them. The number of days which the worms took to spin cocoons varied from thirty to forty after hatching. There were white, orange-colored and greenish cocoons in each set, and there is no doubt that each set produced cocoons of different colors. The cocoons are oval, about 1 inch in length, $\frac{1}{2}$ inch in diameter, and somewhat constricted in the middle. The following is a statement showing the daily yield of cocoons:—

* From 20 to 25 such worms weighed 1 ounce.

Date.	January 1884. No. 1. No.	No. 1. Weight. lb.	oz.	No. 2. No.	No. 2. Weight. lb.	oz.	No. 3. No.	No. 3. Weight. lb.	oz.	Mixed. No.	Mixed. Weight. lb.	oz.
1st	..	..		..	..		..	..		..	..	
2nd	..	..		..	..		..	..		..	..	
3rd	..	..		..	..		..	..		..	..	
4th	..	..		..	..		..	..		..	..	
5th	..	..		..	..		..	..		..	..	
6th	..	..		..	..		..	..		..	..	
7th	..	..		..	..		..	..		..	..	
8th	..	..		..	..		..	..		..	..	
9th	..	..		..	..		..	..		..	..	
10th	..	..		..	..		..	..		..	..	
11th	..	..		..	..		..	..		..	..	
12th	..	..		..	..		..	..		..	..	
13th	..	..		..	..		..	..		..	..	
14th	..	..		..	..		..	..		..	..	
15th	..	..		..	..		..	..		..	..	
16th	..	..		..	..		..	..		..	..	
17th	..	..		..	..		..	..		..	..	
18th	..	..		..	..		..	..		..	..	
19th	..	..		..	..		..	..		88	0	2½
20th	19	0	½	17	0	⅜	..	..		..	..	
21st	12	0	½	22	0	¾	5	0	⅛	..	..	
22nd	13	0	½	19	0	¼	11	0	¼	..	..	
23rd	7	0	¼	13	0	¼	11	0	¼	..	..	
24th	3	0	⅛	12	0	½	3	0	⅛	..	..	
25th	22	0	¾	13	0	¼	20	0	⅛	..	..	
26th	46	0	1¼	33	0	1⅛	55	0	1½	..	..	
27th	74	0	2¼	51	0	1½	63	0	1¾	..	..	
28th	104	0	2¾	119	0	3½	118	0	3¼	..	..	
29th	106	0	3	120	0	3½	142	0	4	..	..	
30th	140	0	4¼	148	0	4⅛	115	0	3½	..	..	
31st	193	0	5	160	0	4¾	238	0	6¼	..	..	
Total ..	739	1	5⅛	727	1	5¼	781	1	5⅛	88	0	2½

Date.	February 1884. No. 1. No.	No. 1. Weight. lb.	oz.	No. 2. No.	No. 2. Weight. lb.	oz.	No. 3. No.	No. 3. Weight. lb.	oz.	Mixed. No.	Mixed. Weight. lb.	oz.	March 1884. Mixed. No.	Mixed. Weight. lb.	oz.
1st	110	0	3	85	0	2½	100	0	2¾	..	..		80	0	1½
2nd	194	0	5	184	0	5	201	0	5½	..	..		82	0	1½
3rd	142	0	3½	150	0	4	193	0	5	..	..		74	0	1½
4th	152	0	3½	160	0	4½	244	0	6¾	..	..		85	0	1½
5th	200	0	5½	221	0	5¾	255	0	7½	..	..		30	0	1
6th	244	0	5½	262	0	6½	312	0	8½	..	..		..	..	
7th	165	0	4	210	0	5½	216	0	5¾	..	..		20	0	½
8th	235	0	5½	300	0	7½	300	0	7½	..	..		50	0	1
9th	300	0	7	300	0	7	300	0	7½	..	..		35	0	½
10th	225	0	5½	270	0	5½	275	0	7½	..	..		45	0	¾
11th	225	0	6½	300	0	7½	300	0	7½	..	..		11	0	⅛
12th	300	0	7½	425	0	9½	500	0	11	..	..		..	..	
13th	245	0	6	450	0	9	403	0	8¾	..	..		..	..	
14th	205	0	5	400	0	9	400	0	9	..	..		..	..	
15th	307	0	7¼	400	0	8½	500	0	9	..	..		..	..	
16th	333	0	7½	334	0	7	333	0	7½	..	..		..	..	
17th	350	0	6	310	0	6½	352	0	7½	..	..		..	..	
18th	350	0	6½	352	0	6½	400	0	8	..	..		..	..	
19th	220	0	5½	307	0	7	430	0	9	..	..		..	..	
20th	150	0	3½	300	0	7½	400	0	9½	..	..		..	..	
21st	162	0	2½	210	0	2¾	300	0	3½	..	..		..	..	
22nd	200	0	4½	300	0	6½	400	0	9½	..	..		..	..	
23rd	200	0	3½	225	0	3¾	302	0	4	..	..		..	..	
24th	150	0	1½	300	0	3½	400	0	6½	..	..		..	..	
25th	..	..		..	..		..	..		..	..		..	..	
26th	..	..		..	..		..	..		1,000	0	16½	..	..	
27th	..	..		..	..		..	..		1,225	0	15	..	..	
28th	..	..		..	..		..	..		125	0	2¼	..	..	
29th	..	..		..	..		..	..		106	0	2	..	..	
30th	..	..		..	..		..	..		..	..		..	..	
31st	..	..		..	..		..	..		..	..		..	..	
Total ..	5,364	7	9¼	6,755	9	4¼	7,816	10	14½	2,456	2	3¾	512	0	9⅞

132. It was found that an ounce of eggs contained about 56,000 eggs, and estimating that of these 30,000 hatched (though there is no evidence to show that even 25 per cent. of the eggs were fertile), the following results are obtained:—

——	Case No. 1.	Case No. 2.	Case No. 3.	Mixed from three cases.	Total.
Possible number hatched ...	45,000	97,500	120,000	...	262,500
Number of cocoons obtained ...	6,103	7,482	8,597	3,056	25,238

A small number of worms were given away, but the mortality must have been very great, or the eggs very bad. The mortality certainly was great and sudden as recorded above. The worms undoubtedly suffered from want of food, but it is open to question whether they died off in great numbers from this cause.

133. These results were so far more satisfactory than that obtained in 1883, that then from 2 oz. eggs, which were nearly all fertile, only 1,522 cocoons were obtained, whilst at the same rate from the $8\frac{3}{4}$ oz. eggs hatched this year only 6,659 cocoons would have been obtained. That experiment was made, however, later in the season, but a fully adequate supply of leaves was available.

The experiment proved nothing more than that silk-worms will thrive here in the cold season, a fact known before; and, judging from previous experience, it appears that the vitality of the eggs produced is destroyed during the hot season in the plains. To get fresh supplies of eggs from the North of India could never be profitable, and unless fertile eggs can be supplied locally, it does not appear likely that the growth of mulberries for the purpose of raising silk-worms can be recommended to private individuals.

134. The crysalides were destroyed in the cocoons by steaming, and the cocoons thereafter dried. A small number of moths were allowed to develop, and about five-eighths of an ounce of eggs has been collected.

135. It was found that 600 fresh, 2,272 dry, or 4,267 cocoons from which the crysalides had been removed, weighed one pound. No properly-trained man for reeling silk could be engaged, but some cocoons were reeled roughly, and it was found that 320 dry cocoons gave 180 grains of reeled silk, that is, at the rate of about 18·2 per cent. The average percentage in trained hands is about twenty-five. The length of thread obtainable from single cocoons was determined in several cases; one was found to be 962 feet, another 801 feet, and another, a double cocoon, was 1,366 feet.

MISCELLANEOUS.

136. *Exchanges.*—The usual exchanges of publications with other departments in India and various societies, &c., abroad were received and deposited in the library of the School of Agriculture, there being no separate library attached to the Reporter's Office.

137. *Departmental Staff.*—Mr. Robertson conducted and supervised the agricultural operations of Government throughout the year, at the close of which, after more than fifteen years devoted chiefly to drawing the attention of the public to the present condition of Indian Agriculture, he passed to the more important work of preparing young men for the labor of devising and introducing reforms therein. Mr. Benson was employed as Lecturer on Agriculture in the College throughout the two working sessions, and was also deputed on the tours already referred to. In June Mr. Schiffmayer, after ten and-a-half years' service in the department, left it with a compassionate gratuity sanctioned by the Secretary of State. He had been till then in charge of the Saidápet Farm, in which position he was followed by Mr. C. K. Subba Row, who continued in charge till the end of the year. Regarding the subordinate staff there is nothing to report.

138. *Finances.*—The following statement shows the expenditure and receipts on account of Agricultural services during the year. The amount debited to the Saidápet Farm includes the cost of the Aden stock imported. The greater portion of the charges for " General Supervision " are debitable to the School of Agriculture, and only a small proportion against the farm :—

Receipts.	Amount.	Expenditure.	Amount.
	RS. A. P.		RS. A. P.
Balance on the 1st of April 1883.. ..	1,73,521 8 10	General Supervision	25,218 14 4
Surplus Pound Fund	34,179 7 6	Saidápet Experimental Farm	14,766 15 10
Refund of compensation	75 0 0	School of Agriculture	23,851 7 3
Saidápet Experimental Farm	10,662 15 4	Estate charges and improvements ..	2,034 10 8
School of Agriculture (rent and sale of books)	241 14 0	District operations	3,248 14 8
Cattle Disease Inspection	304 5 6	Cattle Disease Inspection	23,102 11 5
		Balance in favor of the department on the 1st of April 1884	1,26,761 9 0
Total ..	2,18,985 3 2	Total..	2,18,985 3 2

For details see Appendix IV.

The following is a comparative statement of the receipts and expenditure during the past four years under each heading :—

Items.	1880-81.	1881-82.	1882-83.	1883-84.
	RS.	RS.	RS.	RS.
Receipts—				
Provincial Grant	20,000	20,000	..	..
Surplus Pound Fund	41,694	46,832	29,086	34,254
Departmental Receipts	4,003	4,992	6,049	11,209
Total ..	65,697	71,824	35,135	45,463
Expenditure—				
General Supervision	17,196	21,468	23,285	25,219
Saidápet Experimental Farm	7,637	10,198	10,830	14,767
School of Agriculture	15,401	20,325	24,843	23,851
Estate charges and improvements	3,531	2,811	2,487	2,035
District operations	..	..	7,190	3,249
Cattle Disease Inspection	..	..	8,809	23,103
Total ..	43,765	54,802	77,444	92,224

I have the honor to be,
Sir,
Your most obedient servant,

SAIDAPET,
7th June 1884.

(Signed) C. BENSON, M.R.A.C.,
Agricultural Reporter to the
Government of Madras.

APPENDIX I-A.

STATEMENT showing the Daily Rainfall during the Year 1883-84.

Date.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
1st ..	..	..	..	..	·01	·03	..	1·15	..	..	..	..
2nd ..	..	..	..	2·75	·28	·02	..	·45	..	..	..	..
3rd ..	..	..	..	·30	·02	..	1·95	4·50	..	..	..	..
4th ..	..	..	·15	..	..	..	·47	·95	..	..	..	..
5th ..	..	..	·60	..	..	..	·12	·10	..	·68	..	..
6th ..	..	..	..	·02	·17	..	..	·20	..	·05	..	..
7th ..	..	..	..	·75	..	..	..	·45	..	..	..	..
8th ..	..	..	..	1·40	..	..	·17	·25	..	..	..	..
9th ..	..	..	·01	..	..	..	·57	·27	..	..	..	..
10th ..	..	..	..	..	·01	..	..	..	..	..	..	..
11th ..	..	..	..	·06	..	..	·26	..	1·95	..	..	..
12th ..	..	..	..	·73	..	..	·75	..	·25	..	..	..
13th ..	..	..	..	·41	..	..	·48	..	4·05	..	..	..
14th ..	..	..	..	·25	..	..	2·10	..	1·95	..	..	..
15th ..	..	..	..	·03	..	..	1·24	..	2·19	..	..	..
16th ..	..	..	..	..	..	..	1·25	..	·47	..	..	..
17th ..	..	..	..	..	..	..	3·37	..	..	..	..	..
18th ..	..	..	·50	2·32	·13	..	·17	·37	..	..	..	..
19th ..	..	..	..	..	..	..	..	1·70	..	..	..	..
20th ..	..	..	..	·88	·98	·01	·09	3·33	..	1·63	..	..
21st ..	..	..	·05	..	..	..	·05	..	..	..	..	..
22nd ..	..	..	..	..	·25	..	..	..	..	..	..	..
23rd ..	..	..	·01	..	·57	..	..	..	..	..	..	..
24th ..	..	..	·81	·02	·30	..	..	..	..	..	..	..
25th ..	..	..	·01	..	..	..	..	..	·97	..	..	..
26th ..	..	..	·18	·06	..	..	·03	..	..	..	..	..
27th ..	..	..	..	..	..	..	1·85	..	..	..	..	..
28th ..	..	..	·05	·30	..	·32	1·95	..	..	..	..	..
29th ..	..	..	·33	·05	..	..	2·32	..	..	..	..	..
30th ..	..	..	..	..	·15	2·10	·60	..	..	..	..	..
31st ..	..	..	..	..	·02	..	..	..	..	..	..	..
Total ..	..	..	2·70	10·33	2·89	2·48	19·79	13·72	11·83	2·36	..	..

APPENDIX I-B.

STATEMENT showing the Monthly Rainfall during 1883-84 compared with the average of the previous thirteen years.

Months.	1883-84.		AVERAGE OF 13 YEARS.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April	...	...	·31	·54
May	...	...	3·51	1·85
June	2·70	11	2·33	5·54
July	10·33	16	3·53	8·47
August	2·89	12	4·97	9·62
September	2·48	5	6·16	8·01
October	19·79	20	10·91	10·38
November	13·72	12	15·07	12·62
December	11·83	7	3·93	5·07
January	2·36	3	·45	1·23
February	...	...	·78	·53
March	...	...	·27	·53
Total ...	66·10	86	52·22	64·39

APPENDIX I-C.

STATEMENT showing the Weekly Rainfall in 1883-84 compared with the average of the previous thirteen years.

Weeks.	1883-84.		Average of the Previous 13 Years.		Weeks.	1883-84.		Average of the Previous 13 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.		Rainfall.	Wet Days.	Rainfall.	Wet Days.
1st week	..	..	·17	·15	27th week	4·64	4	2·19	2·46
2nd ,, ...	..	..	·01	·15	28th ,, ...	2·23	5	1·98	1·92
3rd ,, ...	..	..	·05	·15	29th ,, ...	8·22	6	2·24	2·92
4th ,, ...	..	..	..	..	30th ,, ...	1·93	3	3·43	3·15
5th ,, ...	..	..	1·10	·46	31st ,, ...	10·97	6	1·88	2·08
6th ,, ...	..	..	·10	·23	32nd ,, ...	2·22	6	3·16	2·69
7th ,, ...	..	..	·19	·23	33rd ,, ...	..	..	4·02	3·54
8th ,, ...	..	..	2·10	·77	34th ,, ...	5·40	3	3·98	2·92
9th ,, ...	..	..	·15	·46	35th ,, ...	..	..	3·87	2·69
10th ,, ...	·76	3	·59	1·15	36th ,, ...	..	..	1·28	1·69
11th ,, ...	..	..	1·05	1·61	37th ,, ...	10·39	5	·75	1·08
12th ,, ...	·56	3	·18	1·00	38th ,, ...	·47	1	·46	·85
13th ,, ...	1·38	5	·44	1·54	39th ,, ...	·97	1	·47	·92
14th ,, ...	3·82	4	·53	1·46	40th ,, ...	·68	1	·29	·47
15th ,, ...	2·85	5	·69	1 92	41st ,, ...	·05	1	·06	·15
16th ,, ...	3·23	3	·85	1·77	42nd ,, ...	..	..	·06	·31
17th ,, ...	·38	3	·81	2·23	43rd ,, ...	1·63	1	·14	·31
18th ,, ...	·36	6	1·16	2·39	44th ,, ...	..	..	·15	·23
19th ,, ...	·18	6	1·30	2·39	45th ,, ...	..	..	·54	·39
20th ,, ...	·13	1	1·35	2·31	46th ,, ...	..	..	..	..
21st ,, ...	2·10	4	·72	1·77	47th ,, ...	..	..	·19	·08
22nd ,, ...	·20	3	1·42	2·39	48th ,, ...	..	..	·11	·15
23rd ,, ...	·02	1	1·79	2 31	49th ,, ...	..	..	·06	·23
24th ,, ...	..	..	1·42	2·15	50th ,, ...	..	..	..	..
25th ,, ...	·01	1	1·55	1·39	51st ,, ...	..	..	·16	·23
26th ,, ...	·32	1	1·02	1·31	52nd ,, ...	..	..	..	..

APPENDIX II-A.

STATEMENT showing the Outturn of Fodder Crops for the Year 1883-84.

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date.	Sowing. Seed. Total.	Sowing. Seed. Per Acre.	Details of Harvesting. Date.	Details of Harvesting. Outturn. Total.	Details of Harvesting. Outturn. Per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
			ACRES.		LB.	LB.		LB.	LB.	DAYS.			
1	Horse-gram	10-A ..	2·15	6th June 1883..	56	26	16th August 1883..	3,604	1,676	72	12·77	30	Injured by thirteen days' drought after sowing.
2	Do.	10-A ..	1·08	4th December ,, ..	84	77	12th February 1884..	4,308	3,989	70	2·36	3	
3	Do.	10-B ..	1·93	30th June ,, ..									Grown between the lines of cotton.
4	Do.	10-B ..	·59	2nd January 1884..	60	33·7	1st September 1883.	5,992	3,366	64	13·25	29	
5	Do.	11 ..	1·48	5th June 1883..	55	37·2	13th August ,, ..	2,772	1,873	70	13·37	31	In this case the fodder was weighed dry.
6	Do.	14 ..	2·35	26th May ,, ..	109	46	9th ,, ,, ..	8,003	3,535	77	13·52	32	
7	Do.	15 ..	3·42	26th June ,, ..	100	27·3	16th ,, ,, ..	16,066	4,432	52	11·38	24	
8	Do.	18 ..	·25	23rd ,, ,, ..	5·25	21	11th ,, ,, ..	944	3,776	50	12·21	27	
9	Do.	22 ..	1·63	4th July ,, ..	42	25·7	15th September ,, ..	2,653	1,627	73	10·22	28	
10	Do.	22 ..	1·63	3rd March ,, ..	40	24·5	4th May ,, ..	1,835	1,126	63	..	..	
11	Do.	23 ..	2·12	29th June ,, ..	40	18·8	4th September ,, ..	2,016	951	68	13·65	32	
12	Do.	28-C ..	·99	10th March ,, ..	30	30	22nd May ,, ..	920	929	74	..	..	
13	Do.	29 ..	1·78	1st July ,, ..	46	25·8	31st August ,, ..	680	382	62	13·22	28	
14	Do.	29-B ..	1·08	7th March ,, ..	30	39	5th May ,, ..	730	948	76	..	..	
15	Do.	30-A ..	2·05	28th February ,, ..	45	21·9	14th ,, ,, ..	3,685	1,797	76	..	..	
16	Do.	34-A ..	1·38	30th June ,, ..	54	39·1	4th September ,, ..	4,680	3,391	67	13·27	30	
17	Do.	34-B ..	·77	28th February ,, ..	30	39	5th May ,, ..	730	948	76	..	..	
18	Do.	35-B ..	·61	26th ,, ,, ..	25	41	8th ,, ,, ..	816	1,337	72	..	..	
19	Do.	36-A, B, and C.	2·94	6th March ,, ..	50	17	2nd June ,, ..	3,656	1,244	89	..	..	
20	Do.	37-A ..	·45	7th ,, ,, ..	11	24	26th May ,, ..	1,520	3,378	81	..	..	
21	Horse-gram and Cumboo ..	4 B-III ..	·60	4th June ,, ..	15	25	4th August ,, ..	1,093	1,822	61	..	..	
22	Yellow Cholum	11 East ..	1·48	17th February ,, ..	71	47·9	17th May ,, ..	3,604	2,435	90	..	..	
23	Do.	13 North ..	1·15	25th October ,, ..	32	27·8	11th January 1884..	7,060	6,139	79	33·03	26	
24	Do.	28-C ..	·99	16th June ,, ..	51	51	4th August 1883..	1,250	1,263	50	12·58	27	
25	Do.	32 ..	4·76	27th ,, ,, ..	112	23·5	13th October ,, ..	28,386	5,963	109	20·85	43	
26	Do.	34-B ..	·77	23rd ,, ,, ..	11	14	24th April ,, ..	1,298	1,685	63	14·44	32	
27	Do.	15 ..	1·00	17th December ,, ..	22	22	26th February 1884.	1,232	1,232	71	3·33	4	
28	Red Cholum	11 ..	1·48	13th January 1884.	40	33	12th April ,, ..	4,238	3,591	60	..	..	
29	Maize	15 ..	1·02	1st October 1883.	43	42	8th December 1883.	3,904	3,827	68	33·51	32	
30	Do.	10-A ..	1·08	6th ,, ,, ..	48	44	4th ,, ,, ..	4,470	4,139	59	30·97	29	
31	Do.	10-B ..	·59	8th ,, ,, ..	19·4	33	18th ,, ,, ..	5,927	10,045	71	41·83	35	Includes the thinnings of ·37 acres more.
32	Amber Sugar-cane	33 ..	1·18	1st ,, ,, ..	30	20·3	8th ,, ,, ..	4,726	4,005	68	33·51	32	
33	White Cholum	15 ..	1·02	8th December ,, ..	45	44	26th February 1884.	1,558	1,527	80	14·19	10	
34	Do.	4-A ..	2·80	29th November ,, ..	145·5	52	{ 15th March ,, ..	25,691	9,175	108	14·19	10	
							{ 8th May ,, ..	11,070	3,953	54	..	..	
35	Sorghum Saccharatum, White Cholum, &c.	33 ..	1·18	8th December ,, ..	65	55	28th February ,, ..	1,120	950	82	14·19	10	

Statement showing the Outturn of Fodder Crops for the Year 1883-84—(*Continued*).

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date.	Sowing. Seed. Total.	Sowing. Seed. Per Acre.	Details of Harvesting. Date.	Details of Harvesting. Outturn. Total.	Details of Harvesting. Outturn. Per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
			Acres.		lb.	lb		lb.	lb.	Days.			
36	Cumboo	17	2·00	7th July 1883 ..	41	20·5	1st September 1883 ..	3,456	1,728	57	10·18	22	
37	Do.	33	2·36	28th June ,, ..	65	56·5	11th August ,, ..	3,818	1,617	45	11·20	23	Fodder weighed dry.
38	Do.	36-B	·40	21st July ,, ..	14	35	31st ,, ,, ..	340	850	42	3·32	16	
39	Shamay	30-A	2·05	21st ,, ,, ..	40	19·5	5th October ,, ..	8,216	4,007	77	8·34	24	
40	Do.	37-B, C, and D.	1·13	11th ,, ,, ..	52	29	25th ,, ,, ..	13,871	7,706	107	23·52	43	
41	Planter's Friend	16 South ..	1·83	1st October ,, ..	78	42	8th December ,, ..	3,834	2,089	69	33·51	32	
42	Goondoo-Sumba paddy	R, F, A ..	·81	10th August ,, ..	50	61	7th ,, ,, ..	1,764	2,177	120	38·40	45	
43	Do. do. ..	R, F, C ..	·52	16th June ,, ..	30	57	10th January 1884 ..	1,706	3,088	210	80·71	82	
44	White Car paddy	R, F, D ..	·39	25th April ,, ..	20	51	30th June 1883 ..	4,180	10,718	67	2·70	11	
45	Car paddy	23	1·40	8th December ,, ..	70	50	20th March 1884 ..	3,655	2,161	103	14·19	10	
46	Do.	34-B	·38	Planted. 4th March 1884 ..	..	..	2nd April ,, ..	2,369	6,234	About. 40	..	..	
47	Do.	22	·63	10th January ,, ..	30	50	10th ,, ,, ..	2,218	3,520	91	1·63	1	
48	White and Yellow Cholum ..	16 South ..	1·83	18th December 1883 ..	35	19·1	15th March ,, ..	5,186	2,834	88	3·33	4	
49	Sorghum Saccharatum and sundry other Fodder crops.	23	1·40	20th ,, ,, ..	51	36·4	20th ,, ,, ..	3,655	2,161	103	14·19	10	
50	Tennay	17	·50	17th November ,, ..	20	40	12th January ,, ..	504	1,008	54	19·43	13	
51	Do.	32	2·28	23rd ,, ,, ..	60	26	2nd February ,, ..	1,420	623	71	14·19	10	
52	Guinea grass	15-B	2·85	25th August 1882 ..	Planted ..	..	From 23rd Feb. 1883 to 29th Mar. 1884.	23,173	8,130	400	66·10	86	
53	Do.	15-A	1·12	13th October 1883 ..	Do.	..	From 23rd Feb. 1883 to 25th Mar. 1884.	6,257	5,587	396	66·10	86	
54	Do.	21 East ..	2·97	2nd ,, 1882 ..	Do.	..	From 1st April 1883 to 5th Jan. 1884.	26,351	8,873	280	63·74	83	Crops still standing.
55	Do.	27 East ..	2·17	November 1881 ..	Do.	..	From 3rd Feb. 1883 to 27th Oct. 1883.	10,188	4,694	266	20·94	44	
56	Do.	34	1·38	11th October 1883 ..	Do.	..	23rd April 1884 ..	5,761	4,174	195	16·51	15	

APPENDIX II-B.

STATEMENT showing the Outturn of the Unirrigated Cereal Crops of 1883-84.

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of	Sowing. Amount. Seed Sown.	Sowing. Amount. Per Acre.	Date.	Details of Harvesting. Outturn. Grain.	Details of Harvesting. Outturn. Straw.	Details of Harvesting. Outturn. Grain per Acre.	Details of Harvesting. Outturn. Straw per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
			ACRES.		LB.	LB.		LB.	LB.	LB.	LB.		DAYS.		
1	Maize and Amber Sugar-cane.	4 B-III ..	·60	8th December 1883	Maize 24½, Amber Sugar-cane 2½.	81 8	21st March 1884 ..	Maize 48, Amber Sugar-cane 11.	2,016	Maize 160, Amber Sugar-cane 36.	3,360	104	12·34	9	The Amber Sugar-cane in No. 33 having failed, the 2½ lb. of seed which was on hand was sown here, so that it might be irrigated when necessary. The number of maize cobs obtained was 600.
2	Maize	4 B-IV ..	·44	25th October ,,	37	43	21st February 1884.	225	2,092	511	4,754	119	24·06	27	4,015 cobs were obtained. Half the field was occupied by Nankin cotton. Half the area of the field is therefore apportioned to the crop. Number of cobs —1,087.
3	Do.	10-B ..	·37	8th ,, ,,	42½	22	4th ,, ,,	175	4,767	473	12,833	119	44·19	38	
4	Planter's Friend..	15 ..	1·00	16th November ,,	20	20	5th April ,,	243	4,169	243	4,169	141	19·59	13	
5	Do. ..	16 North ..	1·83	1st October ,,	78	42	30th January ,,	253½	6,530	138	3,566	122	47·70	42	
6	Do. ..	12 South ..	2·43	16th November ,,	70½	29	29th March ,,	700	5,320	288	2,189	134	19·59	13	
7	Sorghum Saccharatum.	12 North ..	1·00	16th ,, ,,	30	30	19th ,, ,,	296	2,924	296	2,924	124	19·59	13	
8	Broom Millet ..	14 ..	1·43	20th October ,,	20	15	23rd February ,,	346	4,230	242	2,958	125	34·80	29	
9	Reana Luxurians.	13 ..	1·58	22nd ,, ,,	21	13	23rd ,, ,,	224	3,656	144	2,358	123	34·66	27	
10	Shamay	37-E ..	·67	11th July ,,	14	20	22nd November 1883.	113	2,137	169	3,189	134	43·99	55	
11	Raggi	11 ..	2·96	19th October ,,	73	49	23rd January 1884.	3,210	13,158	1,084	4,976	95	34·80	29	
12	Do.	23 South ..	2·12	18th ,, ,,	66	31	5th February ,,	628	2,884	296	1,360	109	34·97	30	

APPENDIX II-C.

STATEMENT showing the Outturn of the Irrigated Cereal Crops for 1883-84.

No.	Description of Crop.	Number of Field and Plot.	Area of Field and Plot.	Sowing. Date.	Seed. Quantity Sown.	Seed. Per Acre.	Details of Harvesting. Date.	Outturn. Grain.	Outturn. Straw.	Outturn. Grain per Acre.	Outturn. Straw per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
			ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.			
1	Manakkathay paddy	R.F.	·50	3rd Feb. 1883.	50	100	8th May 1883.	215	1,073	430	2,146	96	..	..	
2	Sixty days' Sumba paddy.	22 West ..	1·00	1st Dec. ,,	50	50	17th March 1884.	370	1,170	370	1,170	108	14·19	10	Soil very sandy and poor.
3	Madagascar paddy.	29 A-I ..	·80	8th Nov. ,,	22	27·5	8th ,, ,,	205	4,947	256	6,184	122	19·86	15	Water-supply deficient when the crop was about to ripen.
4	Car paddy ..	29 A-II ..	·98	21st Dec. ,,	47	47	21st April ,,	856	3,428	873	3,497	123	3·33	4	Supply of water had failed when the crop was about to mature.
5	Goondoo Sumba paddy.	29-B West ..	·41	16th Oct. ,,	Planted.		2nd Feb. ,,	720	3,100	1,756	7,561	110	39·59	32	
6	Do. do. ..	29-B East ..	·35	31st ,, ,,	Do.		1st March ,,	818	3,392	2,337	9,694	123	27·91	22	
7	Do. do. ..	29-B N.-W.	·19	27th ,, ,,	Do.		28th Feb. ,,	510	2,170	2,685	11,421	127	34·63	26	
8	White Car paddy ..	30-A ..	2·05	8th Nov. ,,	96	47	12th March ,,	2,907	8,241	1,418	4,020	116	19·86	15	
9	Madagascar paddy.	31 ..	1·38	3rd ,, ,,	100	72	26th Feb. ,,	1,616	6,334	1,171	4,589	116	26·06	20	
10	Carolina paddy (mixed).	34 B-I ..	·38	5th ,, ,,	Planted.		28th ,, ,,	170	474	447	1,247	117	20 61	18	
11	Do. do. ..	34-B East ..	·39	7th ,, ,,	20	51	24th March ,,	243½	2,332½	624	5,980	139	20·31	16	
12	Sumba paddy ..	35 B-I ..	·61	22nd Oct. ,,	Planted.		6th Feb. ,,	277	3,391	454	5,558	108	34·66	27	
13	Goondoo Sumba paddy.	35 B-II ..	·25	17th ,, ,,	Do.		1st ,, ,,	410	1,722	1,640	6,888	108	38·34	31	
14	White Car paddy ..	35 B-III ..	·03	17th ,, ,,	Do.		17th Jan. ,,	13	147	433	4,900	93	36·71	30	The seedlings were two months old and planted experimentally.
15	Sumba paddy ..	35 B-IV ..	·12	2nd Nov. ,,	Do.		18th Feb. ,,	67	855	558	7,125	109	26·76	21	
16	Carolina paddy ..	35 B-V ..	·17	7th ,, ,,	7	41	15th March ,,	130	822	765	4,835	130	20·31	16	
17	Goonda Sumba paddy.	35 B-V ..	·02	7th ,, ,,	Planted.		22nd ,, ,,	25	159	1,250	7,950	137	20·31	16	
18	White Car paddy ..	36-A North ..	·68	1st ,, ,,	31	45	6th ,, ,,	600	2,056	882	3,023	127	27·91	22	
19	Do. do. ..	36-A South ..	·42	29th Dec. ,,	20	47	26th April ,,	407	1,565	969	3,726	120	2·16	3	
20	Madagascar paddy.	36-B ..	·40	1st Nov. ,,	20	50	6th March ,,	252	1,676	630	4,190	127	27·91	22	
21	White Car paddy ..	36-C ..	·78	2nd ,, ,,	Planted.		11th Feb. ,,	485	3,491	622	4,347	102	26·76	21	
22	Goondoo Sumba paddy.	36-C North ..	·12	2nd ,, ,,	Do.		8th March ,,	233	831	1,942	6,924	128	26·76	21	
23	Car paddy	37-A ..	·45	29th Dec. ,,	30	66	26th April ,,	386	2,184	1,798	4,853	119	2·36	3	
24	Do. ..	37-E ..	·67	8th ,, ,,	20	29	26th ,, ,,	487	3,032	727	4,525	140	14·19	10	
25	Do. ..	37-B, C, and D	1·80	9th Nov. ,,	76	42·2	24th March ,,	1,085	4,939	602	2,743	137	19·61	14	

APPENDIX III-A.

STATEMENT showing the Number of Stock maintained during each month of the Year 1883-84.

Description of Stock.	1883. April.	May.	June.	July.	August.	September.	October.	November.	December.	1884. January.	February.	March.	— Average.
Working Cattle and Bulls..	21	21	21	22	21	20	19	18	18	18	18	17	19·5
Cows	8	8	8	8	8	8	8	8	8	9	12	11	8·6
Big Bull Calves and Heifers.	10	10	10	10	10	10	10	10	10	16	21	19	12·1
Small Calves	5	7	8	8	8	9	10	10	10	12	14	12	9·4
Sheep	83	81	81	81	81	86	78	76	74	73	73	71	78·1
Lambs	5	5	5	18	29	25	41	49	50	47	47	46	30·5
Equivalent as Country Cattle of 300 lb. live weight ..	87·6	88·2	88·7	92·0	91·1	90·2	88·7	87·1	86·8	95·3	107·3	99·8	91·6

One Bull, Bullock or Cow = Two Country Cattle.
One big Bull Calf or Heifer = One head of Country Cattle.
Two small Calves = Do. do.
Five Sheep = Do. do.
Ten Lambs = Do. do.

APPENDIX III-B.

COST of Artificial Food supplied to the Live Stock during the Year 1883-84.

—	WORKING CATTLE AND BULLS. Amount.	Value.	YOUNG STOCK. Amount.	Value.	COWS AND CALVES. Amount.	Value.
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
Ground-nut cake	25,477	318 7 4	6,042	75 8 4	14,365	179 9 0
Bran	102	2 10 11	1,123	29 3 11	6,707	174 10 7
Salt	772	25 11 9	147	4 14 5	495	16 8 0
Grains	974	16 3 9	111	1 13 7	677	11 4 6
Dholl husk	5,587	111 11 10	3,382	6 11 2	7,148	155 3 6
Total ..	..	474 13 7	..	118 3 5	..	537 3 7
Deduct one-third charged to manures.	..	158 4 6	..	39 6 5	..	179 1 2
Net Charge ..	..	316 9 1	..	78 13 0	..	358 2 5
Cost per head per mensem	..	1 5 8	..	0 7 11	..	3 5 1

—	SHEEP. Amount.	Value.	Amount Supplied.	Value.
	LB.	RS. A. P.	LB.	RS. A. P.
Ground-nut cake	14,895	186 3 0	60,779	759 11 8
Bran	883	23 3 8	8,815	229 13 1
Salt	724	24 2 1	2,138	71 4 3
Grains	10	0 2 8	1,772	29 8 6
Dholl husk	..	..	16,117	273 10 6
Total ..	..	233 11 5	..	1,364 0 0
Deduct one-third charged to manures	..	77 14 5	..	454 10 6
Net Charge ..	..	155 13 0	..	909 5 6
Cost per head per mensem	..	0 1 11	..	0 13 2

APPENDIX IV.

VALUATION of the Saidápet Farm and Estate on the 31st of March 1884, compared with that made on the 31st March 1883.

——	Valuation of Stock on the 31st March 1883.	Increase in the Year.	Decrease in the Year.	Valuation of Stock on the 31st March 1884.
Farm.	RS.	RS.	RS.	RS.
Live-stock	3,559	799	...	(a) 4,358
Crops including Fruit and Fuel Trees ...	17,072	722	...	17,794
Manures	103	...	3	100
Implements	5,380	1,650	...	(b) 7,030
Total ...	26,114	3,171	3	29,282
Estate.				
Land	35,000	...	...	35,000
Buildings	22,500	...	1,500	(c) 21,000
Wells and Channels	7,000	...	...	7,000
Total ...	64,500	...	1,500	63,000

(a) Increase is due to the Aden stock imported.
(b) Do. do. value of Swedish ploughs on hand, and machines received from England lately.
(c) Decrease do. less value of the Farm Bungalow.

APPENDIX V.

STATEMENT showing the Accounts of the Madras Agricultural Department for 1883-84.

	RS.	A.	P.	RS.	A.	P.
I. General Supervision—						
Establishment	23,375	9	4			
Travelling charges...	631	5	8			
Stationery	299	5	9			
Contingencies	374	3	2			
Ploughing Competition	168	6	6			
Allowance to Surgeon	320	5	2			
Chittore Agricultural Exhibition...	49	10	9			
				25,218	14	4
II. Saidápet Experimental Farm ...	...	...		14,766	15	10
III. School of Agriculture	...	...		23,851	7	3
IV. Estate Charges and Improvements—						
Repairs to Farm Buildings ...	674	14	8			
Repairs to Superintendent's Quarters	558	2	10			
Repairs to Roads	346	9	10			
Sundry Repairs	166	8	1			
Extension and Repair of Water-channels	288	7	3			
				2,034	10	8
V. District Operations—						
Advertisement charges regarding Fibre Machines, &c.	1,022	8	0			
Woodcuts of Implements, &c. ...	246	0	11			
Bull for District Experiments ...	300	0	0			
Exhibition of Improved Ploughs ...	954	6	1			
Training of Ploughmen	227	1	1			
Experimental Cultivation of Aloes	390	10	4			
Seed Drills	29	6	0			
Agricultural Implements from South Canara	51	4	3			
Swedish Plough Experiment ...	27	10	0			
				3,248	14	8
VI. Cattle Disease Inspection	...	...		23,102	11	5
Total ...				92,223	10	2

	RS.	A.	P.	RS.	A.	P.
Brought over ...	......			92,223	10	2
Adjusted balance at the beginning of the year	1,73,521	8	10			
Income—						
Receipts from the Surplus Pound Fund during 1883-84	34,179	7	6			
Refund of Compensation	75	0	0			
Saidápet Experimental Farm ...	10,662	15	4			
School of Agriculture	241	14	0			
Cattle Disease Inspection	304	5	6			
				2,18,985	3	2
Balance in favor of the department on the 1st of April 1884				1,26,761	9	0

ENCLOSURE No. 2.

From C. BENSON, Esq., M.R.A.C., Agricultural Reporter to the Government of Madras, to the Director of Revenue Settlement and Agriculture, Madras, dated Saidápet, 21st August 1884, No. 709.

Referring to paragraph 17 of my report on the agricultural operations of Government for 1883-84, I have the honor to submit the enclosed file of reports received from the Collectors, &c., showing the results of the experiments made with seeds sent to them. The report from the Kistna District has not been received, but I have preferred not to wait longer for it. It will be forwarded on receipt.

2. The amount of seed sent out in the last official year was shown in the paragraph referred to above; that table, however, does not show the seeds distributed for the sowing season of 1883 only. In the following table the vitality of the seeds in stock on the dates specified is shown. I would ask for particular attention to this, as frequently failures were attributed to bad seed. The seed sent out was usually good and fresh :—

No.	Names of Seeds.	28th April 1883.	6th June 1883.	10th July 1883.	13th August 1883.
		PER CENT.	PER CENT.	PER CENT.	PER CENT.
1	Hawkesbury Maize	96	86	} 84	82
2	Clarence do.	93	83		
3	Sorghum Saccharatum	91	81	49	50
4	Amber Sugar-cane	92	75	65	64
5	Planter's Friend	95	50	50	51
6	Broom Millet	96	70	70	71
7	New Orleans Cotton Seed	2nd May. 78	75	76	75

3. In reviewing these reports a great many difficulties arise. One is that often the reports are incomplete; another is that, as in the case of the reports from Tanjore, Bellary, &c., local measures are quoted for area and outturns; and another is that the entries required in Columns 3 and 10 are not understood. Besides this, to read through such an almost continuous record of failures from causes of all imaginable sorts is very disheartening. The Collector of the Nílgiris, for instance, says "the experiments were most unsatisfactory," the Collector of Trichinopoly refers to the "lack of interest on the part of ryots," the Collector of Coimbatore says "except Mr. Grimes * * other officers do not seem to have taken any interest in the matter," the Deputy Collector, South Arcot, says "ryots take no interest," and so on, the ignorance, apathy and carelessness of the ryot being frequently referred to.

4. The experiments made in South Canara were, as far as testing the value of the crops went, useless, but to show what the plants were they were of some use. The plots were far too small, as was frequently the case in other districts, and on this subject I may quote the Collector of the Nílgiris again as follows :—

"A mistake was made in distributing the seeds to too many individuals."

5. In Malabar all the experiments were failures as well as in Madura, Salem and Nellore. In Chingleput the results were very poor or are incomplete, and in South Arcot they were useless or failures. In Anantapur the seed was kept so long that the crops were poor or failures, and in Tanjore I have been unable to make them out owing to the use of local measures, whilst the manner in which the Collector compares outturn to seed sown is very often a misleading one.

6. With maize the results generally are very disheartening; but one or two successful experiments stand out to show what might be done. In Coimbatore, Mr. Grimes obtained grain at the rate of 1,652 lb. per acre, with 12,217 lb. of dry straw, and at the Cusbah, on a very small plot, 1,325 lb. grain and 10,000 lb. of straw per acre were obtained.

At Chittoor on ninth-class land, which, whatever it is, must be poor, 1,119·6 lb. of grain was obtained from very little over one acre—a very good yield. In Kurnool, a good outturn from the same crop was obtained, whilst the Principal Assistant Collector, Ganjam, reports the very fine outturn of—

$$\left.\begin{array}{r} 1{,}181\tfrac{1}{4}\ \text{lb. grain} \\ 18{,}690\ \ \text{lb. straw} \end{array}\right\}\ \text{off } \cdot 525 \text{ acre}$$

and his report is further interesting as showing the manner in which the Australian seed was appreciated locally.

7. With *Sorghum saccharatum* and *Planter's friend* the reports were mostly of failures, or, what is much the same, very poor. I must, however, note that the former crop is not "Mukka cholum" as the Collector of Chingleput reports, that name referring to maize. Messrs. Minchin Brothers and Company's report, of which a copy is enclosed, is interesting, especially on the point to which I have already drawn your attention, namely, the value of the *Sorghum* extract to distillers. The only district report regarding broom millet is from Cuddapah, and there the results were very poor or *nil*.

8. The results obtained in the experiments with New Orleans cotton are generally incomplete. From Tinnevelly, the Sátúr results, though not complete, are still fair under any circumstances, but those of the other taluks are not of any value. In Coimbatore, the experiments were unsatisfactory, whilst in Cuddapah the results were very bad, and in Kurnool they are not clear. In the Godávari the results were failures, but the remarks made by the Collector are very suggestive.

9. With tobacco, better results were obtained. The outturn in the report from Sankaranainárkoil Taluk is good, but no remark is made as to the quality, whilst the result in Srívilliputur was fair. In the Trichinopoly Taluk, the outturn was heavy and the quality is said by the Collector to have been good, but the samples show bad curing, and the leaf is in such a state as to render it impossible to examine it properly. From Chingleput no results have been received, whilst the report from the Godávari generally speaks of failures, though one or two results are suggestive of greater possibilities with more care.

10. Regarding *Rèana*, the only results are from the Tenkarai Taluk, and there the outturn was very good, but no remarks were made in the report as to whether the crop was appreciated or not.

11. Looking at the results, as a whole, they are unsatisfactory, and it is most doubtful whether any good ones, which are really instructive and valuable, will ever be obtained until they are carried out by persons who are better fitted for the work than the ordinary taluk officials. Until Government start experimental farms in selected typical localities and there try such crops as seem likely to be usefully introduced into this country, we are not likely to be in a position to advise the ryot to undertake their cultivation.

Enclosure No. 3.

From Messrs. MINCHIN BROTHERS, to the Agricultural Reporter to the Government of Madras, dated Aska, 7th July 1884.

On the experimental cultivation of *Sorghum saccharatum* in the year 1882, we have the honor to report that, owing to the imperfect condition of the seed supplied to us, the germination was limited to such an extent that only a very small portion of the plants appeared and matured.

The stand of plant being scanty, calculations of yield per acre were therefore rendered impossible. Owing to the smallness of the harvest, we were not able to avail of our diffusion apparatus for extraction of the saccharine matter, but were induced to use the old and defective method of manufacturing—milling the cane.

Our cultivation consisted of an area of 15 acres; the soil being rich received no manuring, but was ploughed thoroughly; the seed was sown broad-cast.

The first experiment was made on 6th December 1882 with amber sorghum cane; the stalks when brought to the mill were 2 feet in height weighing on average 0·6 lb. each.

From 100 lb. of stalks we secured (by the 2 iron-roller mill) 50·86 per cent. juice, containing 11½ per cent. solid extract.

Another experiment we made on 1st January 1883 showed an increase in weight of stalks from 0 6 to 1·03 lb., but the density of juice fell to 10 per cent.; from 100 lb. stalks we received 50 lb. juice of the above density.

On 4th idem an experiment was made after having the cane "topped," and the juice so obtained had a density of 18½ per cent. solid extract.

As numerous experiments by the old method of mills and open pans have hitherto been made and published, we therefore sent the juice extracted direct to our distillery, where it underwent a rapid fermentation, rendering this material, at all events, most invaluable to spirit manufacturers.

In conclusion, we may add that this year we are taking up the cultivation of *sorghum* on an extensive and scientific principle and will bring our new diffusion apparatus (lately imported from Austria), our evaporators and vacuum pans into operation, and we shall at the end of the year be happy to furnish you with every particular as far as lies in our power.

Enclosure No. 4.

Cattle Inspection.

During the official year, nine probationers have been admitted into the department. One Local Cattle Disease Inspector and one probationer have been dismissed, the former for disobedience of orders, and the latter as being unsuited to the work. The strength of the department on the 1st of April was as follows :—

One Inspector.	Six Local Cattle Disease Inspectors.
One Deputy Inspector.	Nine Probationers.

The work of all subordinates in this branch has given me every satisfaction.

2. The system of inspection is carried on on the same principles as reported by me last year.

3. I visited His Highness the Nizam of Hyderabad's Stud Farm at Rajampet in August, and have paid three visits to Bangalore to attend a committee of inquiry into the prevalence of anthrax in and around that station.

4. The Deputy Inspector is kept constantly itinerating.

5. The Local Inspectors are, as a rule, always away from their headquarters on duty.

6. The probationers are ordered wherever their services are required.

For number of inspections and districts visited—see Appendix No. 1.

Office.

7. The work in the office has been very hard indeed—1,748 letters have been despatched in addition to the various monthly returns, Cattle Statistics, Inspection Reports, Travelling bills, Pay bills, Cash statements, &c.

8. I find one clerk is quite inadequate for the work, as to assist him it takes up a considerable portion of my time, which might be more profitably employed, and were it not that the probationers assisted when not on other duty, the work could never be got through with one man. When they are all gone to districts, of course it will be impossible to carry on the work without extra assistance.

Budget.

9. The sanctioned budget grant for the department for 1883-84 was Rs. 23,500; expenditure, Rs. 23,102-11-5, showing a balance of Rs. 397-4-7 saved under different headings.

10. The receipts on account of treatment of cases, &c., have been Rs. 304-5-6, which shows a decided increase over the previous year.

For particulars of expenditure, &c.—see Appendix No. 2.

Educational.

11. During the two sessions, extending over a space of nine months, I have delivered 250 theoretical and 140 practical lectures at the Agricultural College and the Veterinary Hospital, respectively, on the following subjects :—Zoology, physiology, anatomy, materia medica, therapeutics, toxicology, pharmacy, pathology, dietetics, veterinary obstetrics, &c., &c.

12. The students have given me every satisfaction and are gradually adapting themselves to the practical part of the work, which is a great thing. A few of the students of Class III have turned out very good practical men, especially those whose minds are unfettered by caste prejudices.

Hospital.

13. The hospital has proved of great value as a teaching institution, from the fact that 160 cases were admitted for treatment during the year, thus giving the probationers and students of the Agricultural College every opportunity of seeing a varied practice.

For full particulars of cases—see Appendix No. 3

14. *Op rations.*—Several important operations have been performed, notably removal of a tumour weighing nearly four pounds, and removal of the eye-ball, besides several minor operations, all of which were successful.

15. *Pharmacy.*—During the year, 13,659 doses of medicine, besides disinfectants, have been despatched to the various districts, which represents a deal of labor. It is, however, good training for the probationers.

I have devised a new method of sending out doses for rinderpest and anthrax, which is a great saving. The chief ingredient being carbolic acid is mixed with flour, salt and gum, which, when pounded well together, form a mass somewhat thicker than India-rubber. This mass is then rolled into balls and covered with a paper containing full directions for use. Ten doses can go into the same box in which we used to send out one.

16. *Cattle-shed.*—From want of sufficient accommodation, it was found necessary to erect a new cattle-shed capable of stabling twenty animals.

17. *Snakes.*—One death of a horse took place in hospital from snake-bite, which, from the symptoms presented at the *post-mortem* examination, was undoubtedly due to the bite of a cobra (*Naja tripudians*). The horse took his feed at the usual evening hour, and had evidently lain down to rest and was bitten on the breast as he lay. The syce was alarmed at 8 o'clock at hearing the animal staggering about violently; he immediately called the hospital-keeper, but, before any medicine was given, he was dead. So sudden was the effect of the poison on the system. On looking for the marks of the fangs, only one was found which pierced the skin. The tissues underneath were of a deep greenish purple colour. Cobras have been frequently seen in the hospital compound, and on an average two snakes are killed monthly.

18. *Act No. IV of* 1879.—Five horses, four ponies, and twenty-four bullocks were admitted to hospital under Act No. IV of 1879, and, as may be expected, were poor looking objects, one case in particular attracted my attention, where an unfortunate pony mare came in with her mammary glands one mass of sores from the cruel and frequent application of "the lash." The very teats were lashed to such an extent that they must have sloughed off, as, when the poor thing was first seen, there were none, and, in their place, two large sores. This, without exaggeration, was the worst case of cruelty I ever saw.

19. *Garden.*—The following plants are grown in the garden:

1. Guinea-grass, Panicum jumentorum.
2. Maize, Zea mays.
3. Aloes, Alœ indica.
4. Aniseed, Pimpinella anisum.
5. Ginger, Zingiber officinalis.
6. Chillies, Capsicum annuum.
7. Turmeric, Curcuma longa.
8. Lucerne, Medicago sativa.
9. Hariah grass, Cynodon dactylon.
10. Timothy grass, Phleum pratense.

Many of them did well, more especially the guinea-grass and aniseed. The latter bore a most excellent crop of well-filled seeds. A number of Europe grasses were tried, but did not do well, the soil being too poor.

Experiments.

20. *Protective Inoculation for Anthrax.*—Experiments have been conducted in regard to protective inoculation against anthrax, according to Pasteur's method, for which purpose a supply of Pravaz syringes and vaccine (properly anthracine) were procured from Paris. So far these experiments have proved satisfactory and have resulted in determining the following points:—

1st.—That the anthracine can be imported from Paris with safety.
2nd.—That it readily becomes virulent if the tubes are exposed to tropical heat for any time.
3rd.—That the tubes must be kept in an ice chamber.
4th.—That all animals can be with safety inoculated.
5th.—That the inoculations can only be conducted by a specially trained person.
6th.—The animals so inoculated enjoy perfect immunity, but for how long has not as yet been settled.
7th.—That the anthracine is a *highly dangerous* fluid, especially (the 2nd) in the hands of any one ignorant of its properties.

Another method of protective inoculation was also tried by heating the virus of anthrax to a certain temperature, as recommended by Toussant, but proved a failure. However, I do not intend to let the subject of protective inoculation drop, as I am convinced it must do good.

21. *Salt.*—The denaturalization of salt was tried but was unsuccessful, and the more I study the subject the more am I convinced that it is purely a question of Chemistry and will have to be decided as such. It is, at the same time, an object much to be desired.

22. *Nitrite of Sodium.*—A new drug, the "nitrite of sodium," recommended as an effective agent in the human subject in neuralgia and other allied conditions, was administered in a case

of paraplegia with marked benefit, and I am inclined to think that it will yet prove a useful medicine in this disease, but the dose must be carefully regulated. In this case 20 grains twice daily were given.

23. *Carbolic Acid.*—The exact doses of carbolic acid, which can, with safety, be given to the buffalo, has been definitely settled by experiment. This subject was a matter of considerable doubt and led to some difference of opinion, in fact it was considered that the smallest doses of the acid had a toxical effect on this animal, but I am convinced that the buffalo can take up to one ounce of carbolic acid, *providing it is properly diluted*; while, on the other hand, the smallest dose, *if not properly diluted*, will bring about decided symptoms of uneasiness from the fact of its corroding the walls of the stomach.

24. *Aconite.*—Tincture of aconite. The doses of this agent as laid down in the various pharmacopœias seemed to be wrong and misleading. This I was certain of from the fact that, although the official dose is from 30 to 50 minims for a horse, and for cattle, 40 to 80 minims, I gave to a pony no less than 3 ounces of the tincture, undiluted, within a few hours, without producing the slightest effect. Two ounces were also given to a bullock with the same result. This would go far to prove that aconite had but little effect on herbivora, but, of course, it would have been wrong on my part to give an opinion until trials had been made with the alkaloid, or active principle, of the drug. Consequently, two different specimens of aconitia were obtained from separate sources. Several experiments were made, which showed that the herbivora can take fifty times the dose of the omnivora. In man, the one-fiftieth part of a grain will give rise to the most dangerous symptoms; whereas, it was clearly demonstrated, during these investigations, that, to produce such symptoms in a pony nearly equal in weight to a man of thirteen stones, one grain had to be given. On the other hand, a very small dose of this alkaloid produced death in a dog in a short time.

25. *Boro-glyceride.*—This continues to give the same excellent results, both as an application to ulcers, &c., and as a preserver of morbid specimens. I look upon it almost as a specific for unhealthy ulcers. To prove its highly preservative properties, as I write there is before me a bottle containing vegetables (carrot, onion, potato, turnip and chilly) which were placed there by me on the 19th January 1883, and they are still, comparatively speaking, fresh. The price of Boro-glyceride, Rs. 5 per lb., will always preclude it from general use.

26. *Rudraksham Seed* mentioned in my last annual report has proved of no special benefit in rinderpest. I made many experiments with it, in every form, on all classes of animals, but found that it simply acted as a mild astringent and nothing more. In this opinion I was fully borne out by the Chemical Examiner, who kindly analysed some of the seeds. He reported that they simply contained " a mild astringent property."

27. *The Australian Salt Bush* (*A triplex mummilaria*).—Two healthy specimens of this plant were sent me by Dr. Shortt of Yercaud, but I am sorry to say they did badly in this climate, and, in spite of every care, only lasted a few months, when they died off. The heat was evidently too great for them to thrive in.

28. *Animal Cremation.*—During the late Camp of Exercise at Bangalore, a process was introduced for cremating carcases in a trench. This has been given a few trials and seems likely to be a quick and ready means for the disposal of the bodies of animals dying from such diseases as anthrax, rinderpest, &c. Experiments in this direction are being conducted as carcases are available.

29. *Treatment of Anthrax.*—The American system of treating anthrax is being given a trial. It consists in giving 1 lb. of sulphate of magnesia immediately the case is noticed, followed by 60 drops of nitro-muriatic acid in a pint of water, and 3 grains of bichromate of potash and 2 drachms of chlorate of potash twice daily. The potash salts are recommended to be given in powder mixed with molasses and smeared on the tongue. This has to be continued until the acute stage of the disease has passed off, when one ounce of the hypo-sulphite of soda with one drachm of powdered Peruvian bark may be given daily. It is to be hoped it will prove useful, as anthrax is the most fatal malady we have to deal with.

Mule-breeding.

30. Mule-breeding, having proved a failure, has, under G.O., No. 1376, dated 8th November 1883, been abandoned and all the stallion donkeys sent to Bombay and Bengal, with the exception of two, which were lent to His Highness the Nizam of Hyderabad. These animals had not proved eager foal-getters up to the time I inspected them in August last, but I attributed this to over-feeding, and recommended the officer in charge of them, Mr. Alí Abdoola, Superintendent, Horse-breeding Operations, to reduce their diet and give them plenty of exercise. As to whether this regime has been successful or not I am unable to say, because no report has been received from Hyderabad up to date, although I have frequently written.

31. Two young mules stand at the Veterinary Hospital, Saidápet, part of the produce of the late operations.

Slaughter-houses.

32. The inspection of slaughter-houses in Madras and in the districts, where local cattle-disease inspectors are posted, has been regularly carried on. These inspections are doing good. It was a common thing last year to see animals slaughtered in the last stages of pregnancy, but I am glad to say that this is a thing of the past, in fact, is now rarely if ever seen.

33. The sheep slaughtered in the morning for the petty bazaars are very poor indeed, but in the evening those slaughtered for the general market are fair.

34. The beef inspected has been on the whole tolerably good. A large percentage of the animals slaughtered at Perambore (the only cattle slaughter-house in Madras) are buffaloes; therefore, people must not be under the impression that they always get prime ox-beef in the markets; far from it; nearly 30 per cent. of the carcases exposed there for sale are those of the buffalo, not that I believe for one moment that their beef is less nutritious than that of the ox, but we must not forget that the former is a very foul-feeder in comparison with the latter, which should tend to make his flesh less palatable.

35. I may mention, for general information, that there are certain appearances of beef and mutton found at nearly all seasons of the year, which are most liable to be mistaken for disease; one thing, in particular, are enlargements situated in the fat lining the loins near the kidneys. I am of opinion there need be no fear of buying meat in this condition, as, after careful examination of these bodies, I have come to the conclusion they are simply enlarged glands. In conjunction with Dr. Rogers, I examined them carefully under the microscope, and we were both of the same opinion regarding them.

36. The parasites found commonly in the carcases of cattle and sheep are—

(1) Tœnia.
(2) Distoma hepaticum.
(3) Amphistoma conicum.
(4) Œstrus ovis.
(5) Echinococcus veterinorum.

The most dangerous of these to mankind is tœnia. The greatest care is taken by me to instruct all the men in the slaughter-houses, even the coolies, in the appearances of these pests, and now, when noticed, they are at once collected and placed in boiling water, so as to destroy them, a large chatty of which is constantly kept boiling in each yard. Dogs, which are the main medium for the distribution of the tape-worm, are strictly prevented from entering the slaughter-houses.

37. With the exception of Choolay, which was on a few occasions found dirty, the sanitary condition of the slaughter-houses has been good.

38. From the 1st April 1883 to 31st March 1884, the following animals were slaughtered in the four houses:—

(1) Monegar choultry	186,157	sheep and goats.
(2) Choolay	143,868	„ „
(3) Triplicane	22,919	„ „
(4) Perambore	9,353	cattle.
Total ..	362,287	

39. Cattle and buffaloes averaged at Rs. 25 per head, and taking the number slaughtered as 9,353 per annum, this represents the sum of Rs. 2,33,815.

40. If we average the price of the sheep and goats at Rs. 2-8-0 per head, and take the number slaughtered per annum as 352,934, they represent the sum of Rs. 8,82,335, the grand total for all animals being Rs. 11,16,140.

41. Every year, taking the average weight of the carcase of cattle and buffaloes at 200 lb., there is exposed for sale 1,870,600 lb. of beef, including bone; and of marketable mutton and goat flesh, there are, taking the average carcase at 20 lb., 7,058,680 lb.

42. If we calculate the population of Madras at 405,848, and deduct 8 per cent. for the non-meat eating castes, which leaves 373,380, the above figures give an average of 24 pounds of meat (beef, mutton and goat flesh) per head per annum.

43. One hundred and thirty-four visits to the slaughter-houses have been made. The total number of animals and carcases inspected has been 36,632, or nearly 10 per cent. of the total number slaughtered during the year.

44. *Government Slaughter-house.*—The Government slaughter-house on the farm has been frequently inspected.

Statistics.

45. These have been compiled for the complete official year. Of the contagious maladies, authrax heads the list as being the most fatal, 64 per cent. of those attacked having died. Rinderpest was the most prevalent and attacked 16,833 animals. Madras seems to have been the only district which was not visited by both rinderpest and anthrax, but I have no doubt in my own mind that they prevailed there too, at some time of the year, and it had never been reported to this office.

46. On comparing the portion of this year's statistics with the seven months, compiled last year, I find that the number of deaths are a little over half that of last year. The percentage of deaths on attacks for the seven months of last year was 59·36, and for the corresponding part of this year 41·94, showing a difference of 17·42, which is most favorable.

47. On procuring the prices of animals in each district, I find my calculation of last year, in averaging cattle at Rs.10 per head and sheep at Re. 1, was far below their value. The average price of cattle and buffaloes is Rs. 25 and of sheep and goats Rs. 2-12-0: however, we must deduct $\frac{1}{5}$ from these sums to make allowance for calves and small-sized animals. Now, the deaths in cattle and buffaloes stand at 13,188, and taking them at Rs. 20 amounts to Rs. 2,63,760; deaths of sheep and goats, 1,920, at Rs. 2-4-0 each, makes Rs. 4,320, the total from all deaths being Rs. 2,68,080; and if we accept this calculation of the average price of the various animals as correct, the loss from September to April last year would be Rs. 3,93,696, and the total for the nineteen months under review Rs. 6,61,776, which represents a large sum of money.

For further particulars as to outbreaks, &c.—see Appendices, Nos. 4, 5, 6 and 7.

Remarks.

48. *Cattle Fairs.*—When the Local Cattle Disease Inspectors are not employed in dealing with outbreaks, they have been directed to give every attention to the subject of cattle fairs, for the detection of disease, and to report on the various breeds of animals brought for sale. Some very good reports have been received on this point.

49. *Cattle Disease Prevention Act.*—It has been found necessary to bring Act No. II of 1866 into force during the year in the districts of Vizagapatam and Chingleput.

50. *Pamphlet on Cattle Diseases.*—I have written a pamphlet termed "Plain Hints on Cattle Diseases in India," which will probably prove of service to cattle owners. It is being translated into Tamil so as to reach those most in need of its aid.

51. *Goats.*—While at Hyderabad, I obtained some fine specimens of the Arab goat and have sent one of them to Madura and one to Coimbatore, to endeavour to improve the breed. I have bred two myself, one of which will soon be ready to be sent out to a district, but, unfortunately, the other with its mother died. I am now crossing this breed (Arab) with the Cashmere, which will combine the power and symmetry of the former with the milking qualities of the latter. I am confident this cross will be successful.

(Signed) J. MILLS, M.R.C.V.S., A.V.D.,
Inspector of Cattle Disease.

23rd June 1884.

APPENDIX No. 1.

RETURN of District Duties during the Official Year 1883-84.

No.	Districts.	INSPECTOR. Inspector.	Deputy Inspector.	LOCAL CATTLE DISEASE INSPECTORS. P. Ragoo Pillay.	M. Naraina Rao.	M. V. Ramachandra Iyer.	B. Ramiah Reddy.	M. N. Swernalinga Naicker.	C. Annamalay Moodely.	T. Ramanjulu Naidu.	PROBATIONARY LOCAL CATTLE DISEASE INSPECTORS. M. Bhavani Senker Row.	K. Padmanabhaya.	M. Venkataramana Sastry.	S. L. D'Silva.	H. P. D'Vaz.	A. Conthaya Moodely.	B. K. Santaya.	K. Sethu Row.	M. Kuppoosawmy Sastry.	Total.
1	Anantapur ..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
2	Bellary ..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	1	..	3
3	Cuddapah ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	2	3
4	Coimbatore ..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	2
5	Chingleput ..	1	2	..	..	..	..	..	..	..	3	1	1	..	..	..	1	1	2	12
6	Godâveri ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	Ganjam ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	Kurnool ..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2
9	Kistna ..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
10	Madras ..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2
11	Madura ..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1
12	Malabar ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	Nellore ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	Nilgiris ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	North Arcot ..	..	1	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	3
16	South Arcot ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	Salem ..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	3
18	South Canara ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	Tinnevelly ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	Tanjore ..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	2
21	Trichinopoly ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	Vizagapatam ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
	Bangalore ..	3	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	1	..	6
	Hyderabad ..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
		6	7	1	1	1	1	1	1	1	3	3	5	1	1	1	1	4	4	43

APPENDIX No. 2.

STATEMENT showing Actual Receipts and Charges of the Establishment of the Inspector of Cattle Diseases during the Official Year 1883-84, as compared with the Budget Estimate for 1883-84.

Items.	Sanctioned Estimate.	Up to last Month.	In this Month.		Total.			Amount available on the 1st 188 .		
Expenditure.	RS.	RS.	NO.	RS.	RS.	A.	P.	RS.	A.	P.
Pay of Inspector of Cattle Diseases	7,800	..	..	..	7,800	0	0	..		
Pay of Deputy Inspector of Cattle Diseases ..	3,600	..	..	..	3,600	0	0	..		
Inspector's travelling allowance	700	..	..	..	631	0	0	69	0	0
Deputy Inspector's travelling allowance ..	1,050	..	..	..	1,038	7	4	11	8	8
Pay of Hospital-keeper	900	..	..	..	899	0	0	1	0	0
Pay of Office Clerk	300	..	..	..	296	12	5	3	3	7
Pay of Office Peon	72	..	..	..	72	0	0	..		
Wages of two Hospital Mallies	148	..	..	..	144	0	0	4	0	0
Probationers' Stipends	2,160	..	..	..	2,046	14	6	113	1	6
Wages of Hospital Peon	75	..	..	..	72	0	0	3	0	0
Hospital Expenses	1,195	..	..	..	1,176	2	2	18	13	10
District Medicines	1,200	..	..	..	1,186	1	1	13	14	11
Up-keep of Hospital	150	..	..	..	141	7	9	8	8	3

Items.	Sanctioned Estimate.	Up to last Month.	In this Month.		Total.	Amount available on the 1st 188 .
Contingencies.	RS.	RS.	NO.	RS.	RS. A. P.	RS. A. P.
Probationers', &c., travelling bills	1,450	..	..	..	609 9 11	19 2 5
Service Labels		..	..	..	123 0 0	
Service Telegram		..	..	..	26 2 0	
Stationery, Books, &c.		..	..	..	217 5 4	
Contingencies		..	..	..	89 6 3	
Tents		..	..	..	365 6 1	
Local Cattle Disease Inspectors.						
Salaries of Local Cattle Disease Inspectors ..	2,150	..	..	..	2,028 3 7	121 12 5
Travelling Allowances	550	..	..	..	539 13 0	10 3 0
Total ..	23,500	..	..	..	23,102 11 5	397 4 7
Receipts.						
Cash realized by sale of medicines and treatment of cases, &c.	..	..	..	..	304 5 6	..
Total ..	..	..	..	..	304 5 6	..

APPENDIX No. 3.

Return of the Sick and Lame Animals admitted to the Government Veterinary Hospital for treatment during the Official Year 1883-84.

No.	Disease.	Description of Animals.	Date of Admission.	Date of Discharge.	Result.
1	Sand Crack	Pony ..	11th January 1883 ..	16th April 1883 ..	Relieved.
2	Open Joint	Horse ..	2nd March ,, ..	20th May ,, ..	Cured.
3	Pneumonia	Bullock ..	1st April ,, ..	16th April ,, ..	Relieved.
4	Ulcer	Pony ..	5th ,, ,, ..	31st May ,, ..	Do.
5	Peritonitis	,, ..	5th ,, ,, ..	31st ,, ,, ..	Died.
6	Chorea	Dog ..	5th ,, ,, ..	16th April ,, ..	Incurable.
7	Tumour	Horse ..	11th ,, ,, ..	19th ,, ,, ..	Do.
8	Bursattee	,, ..	14th ,, ,, ..	26th ,, ,, ..	Do.
9	Pneumonia—Acute	,, ..	16th ,, ,, ..	19th ,, ,, ..	Died.
10	Anthrax	,, ..	19th ,, ,, ..	19th ,, ,, ..	Do.
11	Diabetes	,, ..	19th ,, ,, ..	20th ,, ,, ..	Relieved.
12	Albugo	,, ..	23rd ,, ,, ..	20th May ,, ..	Incurable.
13	Fracture	Dog ..	25th ,, ,, ..	25th ,, ,, ..	Destroyed.
14	Sprain	Pony ..	27th ,, ,, ..	26th ,, ,, ..	Relieved.
15	Fever	Bullock ..	27th ,, ,, ..	4th ,, ,, ..	Cured.
16	Bronchitis	Pony ..	8th May ,, ..	28th ,, ,, ..	Do.
17	Wound—Incised	Horse ..	10th ,, ,, ..	29th ,, ,, ..	Do.
18	Fever	Dog ..	11th ,, ,, ..	14th ,, ,, ..	Do.
19	Anthrax	Horse ..	11th ,, ,, ..	17th ,, ,, ..	Do.
20	Fracture	Buffalo ..	12th ,, ,, ..	12th ,, ,, ..	Destroyed.
21	Ulcer	Donkey ..	1st June ,, ..	9th July ,, ..	Cured.
22	Fracture	Pony ..	8th ,, ,, ..	8th June ,, ..	Destroyed.
23	Parotitis	Camel ..	12th ,, ,, ..	16th ,, ,, ..	Died.
24	Sprain	Pony ..	22nd ,, ,, ..	30th ,, ,, ..	Cured.
25	Hepatitis	Horse ..	30th ,, ,, ..	6th July ,, ..	Do.
26	Wound—Lacerated	,, ..	3rd July ,, ..	15th ,, ,, ..	Do.
27	Ulcer	Cat ..	5th ,, ,, ..	11th ,, ,, ..	Do.
28	Rheumatism	Cow ..	2nd August ,, ..	13th August ,, ..	Do.
29	Diarrhœa	Calf ..	11th ,, ,, ..	13th ,, ,, ..	Do.

Return of the Sick and Lame Animals admitted to the Government Veterinary Hospital for treatment during the Official Year 1883-84—(*Continued*).

No.	Disease.	Description of Animals.	Date of Admission.	Date of Discharge.	Result.
30	Ring-bone	Bull	24th August 1883	26th October 1883	Relieved.
31	Fatty degeneration of kidneys	Do.	25th ,, ,,	7th September ,,	Died.
32	Mange	Dog	28th ,, ,,	10th October ,,	Relieved.
33	Extirpation of the eye	Do.	31st ,, ,,	25th September ,,	Cured.
34	Indigestion	Donkey	6th September 1883	8th ,, ,,	Do.
35	Mange	Horse	8th ,, ,,	8th October ,,	Do.
36	Orchitis, chronic	Bull	21st ,, ,,	8th ,, ,,	Relieved.
37	Rheumatism	Cow	24th ,, ,,	3rd ,, ,,	Cured.
38	Eversion of vagina	Bitch	27th ,, ,,	9th ,, ,,	Do.
39	Fever, catarrhal	Sheep	28th ,, ,,	1st ,, ,,	Do.
40	Strangulation	Do.	2nd October ,,	2nd ,, ,,	Died.
41	Tumour	Bull	9th ,, ,,	13th November ,,	Cured.
42	Do.	Dog	12th ,, ,,	29th October ,,	Do.
43	Fever, biliary	Horse	12th ,, ,,	16th ,, ,,	Do.
44	Spavin	Do.	16th ,, ,,	18th December ,,	Relieved.
45	Tympanites	Sheep	16th ,, ,,	17th October ,,	Died.
46	Wound	Horse	20th ,, ,,	7th December ,,	Cured.
47	Abscess	Pony	20th ,, ,,	28th October ,,	Do.
48	Spavin	Bull	24th ,, ,,	31st ,, ,,	Do.
49	Coronitis	Deer	24th ,, ,,	29th ,, ,,	Died.
50	Debility	Mare	25th ,, ,,	13th November ,,	Relieved.
51	Do.	Do.	26th ,, ,,	13th ,, ,,	Do.
52	Anœmia	Bull	27th ,, ,,	30th October ,,	Died.
53	Sprain	Do.	31st ,, ,,	10th November ,,	Cured.
54	Fever, catarrhal	Ewe	1st November ,,	10th ,, ,,	Do.
55	Debility	Buffaloe	25th October ,,	10th ,, ,,	Relieved.
56	Ulcer	Bull	8th November ,,	23rd ,, ,,	Cured.
57	Debility	Mare	12th ,, ,,	5th December ,,	Relieved.
58	Lampas	Pony	11th ,, ,,	21st November ,,	Cured.
59	Do.	Do.	11th ,, ,,	21st ,, ,,	Do.
60	Debility	Bullock	11th ,, ,,	10th December ,,	Relieved.
61	Eczema, acute	Bull	14th ,, ,,	2nd January 1884	Died.
62	Fever, catarrhal	Ram	17th ,, ,,	10th December 1883	Cured.
63	Fever	Do.	18th ,, ,,	11th ,, ,,	Do.
64	Wound	Donkey	18th ,, ,,	27th November ,,	Do.
65	Do.	Do.	18th ,, ,,	8th December ,,	Do.
66	Sprain	Pony	19th ,, ,,	2nd ,, ,,	Relieved.
67	Debility	Mare	19th ,, ,,	29th January 1884	Cured.
68	Wound	Horse	19th ,, ,,	2nd ,, ,,	Do.
69	Sprain	Bull	19th ,, ,,	23rd November 1883	Do.
70	Fever	Ram	20th ,, ,,	12th December ,,	Do.
71	Fever, eruptive	Ewe	23rd ,, ,,	29th November ,,	Do.
72	Do.	Do.	23rd ,, ,,	29th ,, ,,	Do.
73	Do.	Lamb	23rd ,, ,,	29th ,, ,,	Do.
74	Do.	Do.	23rd ,, ,,	29th ,, ,,	Do.
75	Do.	Do.	23rd ,, ,,	11th December ,,	Do.
76	Do.	Ewe	23rd ,, ,,	29th November ,,	Do.
77	Do.	Lamb	23rd ,, ,,	29th ,, ,,	Do.
78	Fever	Do.	23rd ,, ,,	29th ,, ,,	Do.
79	Do.	Do.	23rd ,, ,,	29th ,, ,,	Do.
80	Debility	Horse	23rd ,, ,,	3rd December ,,	Do.
81	Rheumatism	Cow	23rd ,, ,,	7th ,, ,,	Do.
82	Fever, eruptive	Lamb	26th ,, ,,	11th ,, ,,	Do.
83	Wound	Mare	26th ,, ,,	22nd ,, ,,	Do.
84	Tumour	Bullock	26th ,, ,,	29th November ,,	Do.
85	Fever, catarrhal	Cow	26th ,, ,,	29th ,, ,,	Do.
86	Wound	Bullock	27th ,, ,,	9th December ,,	Do.
87	Wound, lacerated	Horse	27th ,, ,,	6th ,, ,,	Relieved.
88	Snake-bite	Do.	6th December ,,	6th ,, ,,	Died.
89	Castration	Donkey	27th November ,,	13th ,, ,,	Cured.
90	Pneumonia, acute	Do.	13th December ,,	14th ,, ,,	Died.
91	Tumour	Bullock	28th November ,,	9th ,, ,,	Cured.
92	Do.	Do.	28th ,, ,,	9th ,, ,,	Do.
93	Do.	Do.	28th ,, ,,	9th ,, ,,	Do.
94	Do.	Do.	28th ,, ,,	9th ,, ,,	Do.
95	Do.	Do.	28th ,, ,,	9th ,, ,,	Do.
96	Fever, eruptive	Lamb	30th ,, ,,	11th ,, ,,	Do.
97	Do.	Ewe	30th ,, ,,	20th ,, ,,	Do.
98	Wound	Horse	30th ,, ,,	15th ,, ,,	Do.
99	Fever, eruptive	Lamb	30th ,, ,,	11th ,, ,,	Do.
100	Fever, catarrhal	Do.	30th ,, ,,	11th ,, ,,	Do.
101	Do.	Do.	30th ,, ,,	20th ,, ,,	Do.
102	Do.	Do.	30th ,, ,,	20th ,, ,,	Do.
103	Diarrhœa	Dog	2nd December ,,	5th ,, ,,	Do.
104	Fever, eruptive	Lamb	3rd ,, ,,	20th December ,,	Do.
105	Tumour	Bullock	4th ,, ,,	22nd ,, ,,	Do.
106	Castration	Pony	4th ,, ,,	19th ,, ,,	Do.
107	Tympanites	Bull	5th ,, ,,	7th ,, ,,	Do.

Return of the Sick and Lame Animals admitted to the Government Veterinary Hospital for treatment during the Official Year 1883-84—(*Continued*).

No.	Disease.	Description of Animals.	Date of Admission.	Date of Discharge.	Result.
108	Tumour	Bullock	4th December 1883.	18th January 1884.	Cured.
109	Dyspepsia	Dog	7th ,, ,,	19th December 1883.	Do.
110	Distemper	Do.	8th ,, ,,	12th ,, ,,	Do.
111	Mange	Do.	8th ,, ,,	12th ,, ,,	Do.
112	Gid	Ram	8th ,, ,,	9th ,, ,,	Incurable.
113	Tumour	Bullock	13th ,, ,,	22nd ,, ,,	Cured.
114	Nephritis, acute	Horse	19th ,, ,,	22nd ,, ,,	Died.
115	Canker	Dog	21st ,, ,,	17th January 1884.	Relieved.
116	Tumour	Bullock	31st ,, ,,	31st March ,,	Cured.
117	Ulcer	Do.	1st January 1884.	11th January ,,	Do.
118	Rupture, spleen	Bitch	10th ,, ,,	10th ,, ,,	Died.
119	Tumour	Bullock	11th ,, ,,	23rd ,, ,,	Cured.
120	Do.	Do.	11th ,, ,,	21st February ,,	Do.
121	Hepatitis, acute	Bitch	13th ,, ,,	13th January ,,	Died.
122	Tumour	Bullock	22nd ,, ,,	4th March ,,	Cured.
123	Do.	Do.	22nd ,, ,,	22nd February ,,	Do.
124	Castration	Bull	20th ,, ,,	22nd ,, ,,	Do.
125	Do.	Do.	22nd ,, ,,	23rd ,, ,,	Do.
126	Do.	Do.	22nd ,, ,,	22nd ,, ,,	Do.
127	Fever, eruptive	Ram	24th ,, ,,	15th ,, ,,	Do.
128	Do.	Do.	31st ,, ,,	15th ,, ,,	Do.
129	Do.	Do.	31st ,, ,,	15th ,, ,,	Do.
130	Do.	Do.	31st ,, ,,	15th ,, ,,	Do.
131	Sprain	Pony	9th February ,,	19th March ,,	Relieved.
132	Ophthalmia	Bullock	11th ,, ,,	14th February ,,	Cured.
133	Wound, lacerated	She-goat	14th ,, ,,	24th ,, ,,	Died.
134	Influenza	Horse	14th ,, ,,	9th March ,,	Cured.
135	Castration	Pony	14th ,, ,,	29th February ,,	Do.
136	Do.	Do.	14th ,, ,,	29th ,, ,,	Do.
137	Hepatitis	Horse	18th ,, ,,	5th March ,,	Do.
138	Laminitis	Do.	19th ,, ,,	19th February ,,	Incurable.
139	Tumour	Bullock	20th ,, ,,	..	..
140	Influenza	Horse	22nd ,, ,,	8th March ,,	Cured.
141	Wound, lacerated	Mare	22nd ,, ,,	5th ,, ,,	Do.
142	Tetanus	Horse	9th ,, ,,	27th February ,,	Died.
143	Pleuro-pneumonia	Dog	28th ,, ,,	28th ,, ,,	Do.
144	Fracture, horn	Bullock	29th ,, ,,	..	..
145	Sprain	Pony	1st March ,,	17th March ,,	Relieved.
146	Amputation, tail	Bullock	5th ,, ,,	11th ,, ,,	Do.
147	Pneumonia	Dog	5th ,, ,,	7th ,, ,,	Died.
148	Paraplegia	Horse	6th ,, ,,	..	..
149	Catarrh	Bullock	7th ,, ,,	11th ,, ,,	Cured.
150	Fever, catarrhal	Lamb	13th ,, ,,	14th ,, ,,	Died.
151	Tympanites	Bullock	12th ,, ,,	14th ,, ,,	Cured.
152	Tumour	Bull	17th ,, ,,	..	..
153	Abrasion of the skin	Bullock	17th ,, ,,	21st ,, ,,	Cured.
154	Pneumonia	Do.	19th ,, ,,	..	..
155	Sprain	Mare	21st ,, ,,	..	..
156	Debility	Horse	22nd ,, ,,	..	..
157	Wound	Bullock	24th ,, ,,	..	..
158	Wound, contused	Do.	25th ,, ,,	..	..
159	Sprain	Horse	31st ,, ,,	..	..
160	Tympanites	Bullock	31st ,, ,,	31st ,,	Died.

Abstract.

Remaining last year	2
Since admitted	158
Discharged—Cured	101
Relieved	19
Incurable	6
Died	21
Destroyed	3
Remaining on the 31st of March 1884	10

Percentage of deaths on number of admissions—13·13.

Admitted.	
Horses	52
Cattle	52
Sheep and Goats	31
Dogs	16
Cat	1
Camel	1
Deer	1
Donkeys	6
Total	160

ENCLOSURE No. 8.

APPENDIX No. 4.

STATISTICAL Return of Cattle Disease in the Presidency of Madras from the 1st of April 1883 to the 31st of March 1884.

No.	Names of Districts.	Strength of Live Stock.				Total.	Number of Animals attacked with									Percentage of Attacks on Strength.
		Cattle.	Buffaloes.	Sheep.	Goats.		Rinder-pest.	Anthrax.	Variola Ovina.	Variola Vaccina.	Epizootic Aphtha.	Dysentery.	Pneumonia.	Hæmaturia.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Anantapur	210,033	39,029	367,165	150,873	767,100	720	25	..	..	87	..	..	..	832	00·10
2	Arcot, North ..	403,195	78,885	130,866	301,242	914,188	1,324	242	..	..	101	..	..	..	1,667	00·18
3	Arcot, South ..	284,804	80,610	453,299	290,097	1,108,810	517	9	..	..	..	..	..	..	526	00·04
4	Bellary	203,032	13,920	216,835	102,117	535,904	737	77	..	..	5	..	..	..	819	00·15
5	Canara, South ..	367,897	173,196	455	8,835	550,383	52	262	..	..	662	..	..	..	976	00·17
6	Chingleput	210,009	51,660	144,814	73,855	480,338	496	708	..	..	124	1	4	3	1,336	00·27
7	Coimbatore	522,105	45,367	467,837	243,775	1,279,084	338	76	..	..	130	..	..	..	544	00·04
8	Cuddapah	591,906	67,962	1,034,822	385,194	2,079,884	466	893	..	186	..	..	1	..	1,546	00·07
9	Ganjam	175,732	28,601	14,842	30,789	249,964	301	104	..	120	..	1	..	..	526	00·21
10	Godávari	287,427	90,827	46,378	56,099	480,731	272	865	..	..	390	..	..	..	1,527	00·31
11	Kistna	358,352	167,994	196,195	108,625	831,166	4,149	6	..	..	1,039	192	87	..	5,473	00·65
12	Kurnool	171,341	79,344	206,019	126,422	583,126	4,414	1,307	..	..	..	..	..	..	5,721	00·98
13	Madras	7,009	2,029	2,370	2,045	13,453	No Disease Statistics received.									
14	Madura	481,857	48,325	317,436	213,346	1,060,964	50	912	..	..	..	..	..	..	962	00·09
15	Malabar	729,922	136,858	1,328	52,298	920,406	223	171	..	..	5	104	..	..	503	00·05
16	Nellore	225,838	43,288	245,361	13,062	527,549	235	369	..	..	726	..	1	..	1,331	00·25
17	Nílgiris	22,036	7,198	2,765	972	32,971	97	15	..	..	101	372	..	..	585	1·77
18	Salem	464,678	43,674	412,692	293,895	1,214,939	115	265	..	..	581	..	..	..	961	00·07
19	Tanjore	875,002	125,003	218,154	217,018	1,435,177	21	546	..	..	12	4	..	..	583	00·04
20	Tinnevelly	335,559	89,003	644,544	198,686	1,267,792	281	2,179	..	..	50	4	..	..	2,514	00·19
21	Trichinopoly ..	422,486	77,786	647,441	265,835	1,413,548	374	25	626	..	11	1	..	..	1,037	00·07
22	Vizagapatam ..	40,899	19,720	13,401	24,079	98,099	1,651	76	..	..	1,905	132	..	..	3,764	3·83
	Total ..	7,391,119	1,510,279	5,785,019	3,159,159	17,845,576	16,833	9,132	626	306	5,929	811	93	3	33,733	00·20

ENCLOSURE No. 9.

APPENDIX No. 5.

ANALYSIS of the Rainfall and Health of Cattle Statement from the 1st of April 1883 to the 31st of March 1884.

Number	—	Number of Districts affected with								Total Number of Districts affected.	Average Rainfall in Inches.
		Rinderpest.	Anthrax.	Epizootic Aphtha.	Variola Vaccina.	Variola Ovina.	Pleuro-pneumonia.	Dysentery.	Hæmaturia.		
1	2	3	4	5	6	7	8	9	10	11	12
1	April 1883	5	1	4	..	1	..	..	..	11	0·85
2	May	6	5	5	..	..	..	..	..	16	2·22
3	June	6	4	2	..	..	..	..	..	12	6·16
4	July	8	6	2	..	..	..	1	..	17	7·50
5	August	11	11	3	2	..	..	2	..	29	6·93
6	September..	10	9	6	..	..	1	3	..	29	3·08
7	October	9	9	4	..	..	2	3	..	27	10·66
8	November..	7	11	..	..	..	1	2	..	21	5·64
9	December	9	6	3	..	..	..	2	..	20	2·83
10	January 1884	13	6	5	..	..	..	1	..	25	0·56
11	February	10	7	6	2	..	..	1	1	27	0·08
12	March	12	4	5	..	..	..	..	..	21	0·16
	Total ..	106	79	45	4	1	4	15	1	255	46·67

ENCLOSURE No. 10.

APPENDIX No. 6.

STATISTICAL Return of Cattle Diseases in the Presidency of Madras from the 1st April 1883 to 31st March 1884.

Number.	Names of Districts.	Number of Deaths from: Rinderpest.	Anthrax.	Variola Ovina.	Variola Vaccina.	Epizootic Aphtha.	Dysentery.	Pneumonia.	Hæmaturia.	Total.	Percentage of Deaths on Strength.	Percentage of Deaths on Number of Attacks: Rinderpest.	Anthrax.	Variola Ovina.	Variola Vaccina.	Epizootic Aphtha.	Dysentery.	Pneumonia.	Hæmaturia.	Percentage of Deaths on Attacks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Anantapur ..	244	17	..	..	2	..	..	..	263	00·03	33·88	68·00	..	..	2·29	..	..	..	31·61
2	Arcot, North ..	870	220	..	..	11	..	..	..	1,101	00·12	65·70	90·90	..	..	10·89	..	..	..	66·04
3	Arcot, South ..	439	8	..	..	..	..	..	..	447	00·04	84·91	88·88	..	..	..	..	..	..	84·98
4	Bellary ..	285	49	..	..	5	..	..	..	339	00·06	38·67	63·63	..	..	100·00	..	..	..	41·39
5	Canara, South..	30	127	..	..	21	..	..	..	178	00·03	57·69	48·47	..	..	3·17	..	..	..	18·23
6	Chingleput ..	342	479	..	..	9	1	4	3	838	00·17	68·95	67·65	..	..	7·25	100·00	100·00	100·00	62·72
7	Coimbatore ..	100	42	..	..	10	..	..	..	152	00·01	30·03	55·26	..	..	7·69	..	..	..	27·94
8	Cuddapah ..	283	512	..	107	..	1	..	..	903	00·04	60·72	57·33	..	57·52	..	100·00	..	..	58·40
9	Ganjam ..	230	31	..	96	..	..	1	..	358	00·14	76·41	29·80	..	80·00	..	..	100·00	..	68·06
10	Godávari ..	168	227	..	..	121	..	..	..	516	00·10	61·76	26·24	..	..	31·02	..	..	..	33·79
11	Kistna	1,995	5	..	..	105	66	29	..	2,200	00·26	48·08	83·33	..	..	10·10	34·37	33·83	..	40·19
12	Kurnool ..	1,799	706	..	..	..	..	..	..	2,505	00·42	40·75	54·01	..	..	..	..	..	..	43·78
13	Madura ..	50	843	..	..	..	..	..	..	893	00·08	100·00	92·43	..	..	..	..	..	..	92·82
14	Malabar ..	125	52	..	..	..	63	..	..	240	00·02	56·05	30·40	..	..	..	60·57	..	..	47·71
15	Nellore ..	225	326	..	..	46	..	..	..	597	00·11	95·74	88·34	..	..	6·33	..	..	..	44·85
16	Nilgiris ..	40	15	..	..	12	179	..	..	246	00·74	41·23	100·00	..	..	11·88	48·11	..	..	42·05
17	Salem	25	220	..	..	9	..	..	..	254	00·02	21·73	83·01	..	..	1·54	..	..	..	26·43
18	Tanjore ..	15	443	..	..	2	..	..	..	460	00·03	71·42	81·13	..	..	16·66	..	..	..	78·90
19	Tinnevelly ..	164	1,483	..	..	..	..	..	..	1,647	00·12	58·36	68·05	..	..	..	..	..	..	65·51
20	Trichinopoly ..	133	21	437	..	2	..	..	..	593	00·04	35·56	84·00	69·80	..	18·18	..	..	..	57·18
21	Vizagapatam ..	262	45	..	..	41	30	..	..	378	00·38	15·86	59·21	..	..	2·15	22·72	..	..	10·04
	Total ..	7,824	5,871	437	203	396	340	34	3	15,108	00·08	46·48	64·29	69·80	66·33	6·67	41·92	36·55	100·00	41·46

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

G.O., dated 19th December 1884, Nos. 1412 1412-A, Revenue.

Read—the following Proceedings of the Board of Revenue, dated 22nd October 1884, No. 3637 :—

Resolution—dated 22nd October 1884, No. 3637.

Submitted to Government.

2. The 27 opening paragraphs of the Director's report are themselves a review of the discussions and work of the past and of previous years and call for no remark. With reference to paragraph 15, however, it may be mentioned that the Board have adopted the proposals of Mr. Lakshmikanta Rao relating to the dates on which the instalments of land revenue should fall due in North Arcot District.

3. Paragraphs 28 to 38 deal with the farm at Saidápet. The Board have on several occasions lately placed before Government their views on the failure of this farm and need not now reiterate them. They, however, emphasize the tone of regret for wasted opportunities which underlies these eleven paragraphs of the Director's report.

4. In paragraph 37, Mr. Wilson comments upon the experiment recorded at paragraph 57 of Mr. Benson's report. Six small plots of 1,080 square feet, or about the fortieth part of an acre each, were planted with two different kinds of rice plants and were irrigated with one inch, two inches and three inches of water respectively at intervals. In the statement of outturn per acre there is a clerical error of 31,638 instead of 21,638 which gives one of the one-inch plots ten thousand pounds weight of straw to which it is not entitled. The yields of grain were not good. The best was on one of the two-inch plots which yielded at the rate of 1,654 lb. per acre. In the reply given by Mr. Wilson to the Famine Commissioners the average yield per acre of rice lands in this Presidency is 1,884 lb. and in some localities it exceeds 2,500 lb. No mention is made by Mr. Benson of the amount of water used ordinarily by native farmers, and hence it is impossible to judge of the comparative value of these experiments. At page 266 of the Kistna Manual it is stated that the ryots, even in the Kistna delta, receive less than two cubic yards per acre per hour, and, of course, in wet weather, such as was experienced at Saidápet in November 1883, the ryots would shut off the sluices and would take no water. At this rate the amount of water applied to a crop, which is on the ground for 137 days, as this was, would be less than 6,576 cubic yards per acre or less than 49 inches, making no allowance for rainfall. Mr. Benson gave these plots irrigation in addition to a rainfall of 26·76 inches, so that three plots received 39·76, 52·76 and 65·76 inches respectively. The Board do not think that a ryot would have given his lands as much water as this. It is no wonder that the three-inch plots, thus deluged with an amount of water which even the deltaic rice lands do not receive, showed inferior outturns of grain, although in one instance the yield of straw was the highest. The figures, therefore, cannot be said to show "that a much smaller quantity of water than is commonly used by the ryots will suffice to produce very good crops." On the contrary they show that a much greater quantity of water than is commonly used by the ryots can be poured into a field without much injury to the crop, but this result was already known to all who have witnessed the marvellous way in which the rice plant recovers after being submerged by floods, the reason being that it is an aquatic plant.

5. *Paragraph* 41.—A seed-drill, cost Rs. 77, "beyond the reach of the great bulk of native agriculturists," was imported, although the seed-drill used by the ryots, cost

Rs. 5 to Rs. 10, is "a very effective implement." Here the Director has laid bare the secret of much of the failure of the trained agriculturists who have been brought to Madras. Disdaining to recognize the fact that the native methods are effective and such as are within the reach of the ryot, they endeavour to substitute for them costly European methods which are beyond his reach.

6. *Paragraph* 44.—The experiments with the eggs of the Chinese and Cashmerian silkworm were tried at Saidápet and Rajahmundry, and were tolerably successful at both places, but the Board do not understand how silkworms at Rajahmundry fed on lettuce leaves in the absence of mulberry leaves, while the worm at Saidápet not only refused to eat the lettuces given to them, but died of starvation. The Board cannot help thinking that bitter leaves were given them which killed them, and that with more care in the selection of the lettuces, the worms would have thriven equally well at Saidápet as at Rajahmundry.

7. *Paragraphs* 45 *and* 46.—The subject of Tassar silk has been exhaustively dealt with in the experiments of Major Coussmaker and others. Mention might have been made of the paper on the Tassar moth, written by Mr. Rhodes Morgan, Deputy Conservator of Forests, who suggested an attempt to domesticate the moth, which, however, was not adopted by Government.

8. *Paragraph* 48.—The subject of fibres is attracting attention in commercial circles in Madras. What is wanted is cheapness in preparation and a constant supply of fibre for shipment to Europe. The matter seems to have passed beyond the experimental stage. The fibres are known, and if they can be procured in sufficient quantity and at remunerative rates will take their place amongst exports.

9. *Paragraph* 60.—The Board concur with the Director's opinion that in the improvement of herds and flocks by selection of sires the native agriculturist must be led by example and not driven by legislation.

10. Mr. Mills' report is most interesting and shows that he is doing not only excellent work, but work that is being rapidly and thoroughly appreciated by the natives.

(True Copies and Extract.)

(Signed) G. MACKENZIE,
Acting Sub-Secretary.

To the Secretary to Government, Revenue Department.
Copy to the Director of Revenue Settlement and Agriculture.

ORDER—dated 19th December 1884, No. 1412, Revenue.

Miscellaneous.

The Director of Agriculture submits his Administration Report for the year 1883-84 in the revised form prescribed by the Government of India.* In view, however, to furnish at one view a complete account of the whole work accomplished under his direction during the year, the Director also briefly notices the operations of the Settlement and Irrigation Departments and of the Inam Commission. These form the subjects of separate annual reports, of which that dealing with the operations of the Settlement Department has already been reviewed by Government,† while those relating to the Inam Commission and the compilation of irrigation accounts will be separately noticed hereafter. The Government do not, therefore, propose to record any remarks on these subjects at present, but will pass at once to the several sections of the Agricultural Report proper.

* Circular No. 54-A, dated 28th April 1884.

† G.O., dated 8th November 1884, No. 1225.

2. *Village Records*.—In connection with this subject, the most important change of the year was the adoption of a proposal to class service as a Revenue Inspector (or "Kanungo") as "qualifying" for the superior post of Tahsildar. Proposals are also under consideration for the revision of the Manual of village accounts.

3. *Analysis of Districts.*—The Government note with interest the Director's remarks on the analysis of districts with special reference to Kurnool, the first district taken up for inquiry. The laboriousness of so minute an investigation as has now been initiated is not less obvious than its importance. The Government desire more detailed information as to the scope and methods of the inquiry, the results which have been gained, and the way in which these are to be made available for use; and should the report on these points be satisfactory, the Government will be prepared to consider the question of extra aid if required. It is understood that the Director contemplates proposing the entertainment of a staff of district agricultural inspectors for this and similar purposes.

4. *Collection of Revenue.*—In regard to the system of collection of revenue in precarious tracts, the Government observe that the whole question of "Kistbandi" has recently been taken up and discussed in a comprehensive spirit, and that the scheme which the Government are disposed to adopt, and which seems to them practicable and suitable, has been referred to the Board of Revenue, with instructions to obtain and report the opinions of district officers, with their own, as soon as possible. It is hoped that the result of the present discussion will be to bring this long-vexed question to a final and satisfactory settlement.

5. *Famine Protection.*—Under the head of Protection, the Director deals first with arboriculture and fodder reserves—matters which fall chiefly within the province of the Forest Department, and which will be separately noticed hereafter by Government in reviewing the annual report of that department. The discussion on the reclamation of sandy wastes, to which the Director alludes, was the means of bringing together much useful information on the subject. It was obvious, however, that the task was one which no Government could undertake upon any considerable scale, and that operations must of necessity be confined to localities where they would seem to be specially needed. Wherever there was a prospect of a profit to be derived from the area reclaimed, private enterprise had already done much and might be expected to do more. The Government note with satisfaction that the Australian salt bush (*Atriplex nummularia*) has done fairly well on the farm and that some of the plants have seeded. A supply of the seed should be carefully maintained, if practicable, for distribution and experiment in different parts of the Presidency.

6. The discussion on the subject of well cultivation, referred to by the Director, resulted in the issue of new rules on the subject, which provided that no water-rate should be charged on dry lands irrigated solely from private wells situated on private property, and that, in wet lands, provided the tank or other irrigation source received no supply whatever while the crop was on the ground, crops raised under private wells should be charged at dry rates. These rules were introduced experimentally after the close of the period under review, and will be reconsidered after they have been in force for three years.

7. *Agricultural Experiments and Farms.*—The fifth section of the report, to which the remarks of the Board of Revenue are practically confined, relates to agricultural experiments and the Government Farm at Saidápet. Operations on the farm were chiefly directed in the interests of the educational work of the Agricultural College, with which it continued to be connected until the close of the year. The season was very unfavorable, long droughts alternating with heavy rains, the consequence being the complete failure of most of the plots sown with cotton and maize, and considerable injury to the cholum, planter's friend and other sorghum crops. The only crops that did even tolerably well were raggi, paddy and some of those grown for fodder.

8. An interesting experiment, the results of which were fairly encouraging, was made with Punjab wheat, grown as a garden crop. Experiments were also made with common salt and other manures, but the data obtained were not sufficient to justify any very definite conclusions. The results of the irrigation experiments conducted during the year were similarly vitiated, as pointed out by the Director, by insufficient data, no attempt having been made to ascertain the amount of water actually used on land of similar quality by an ordinary ryot. No one, of course, doubts that the excessive use of water is injurious. The whole question is, whether the ordinary ryot uses it to excess or not.

9. The spontaneous establishment of Agricultural Societies in Madura and North Arcot is a gratifying sign of the public interest which has been aroused on the subject of agricultural improvement, and the example thus set by the leading native inhabitants of the districts named is one which might probably be followed with great advantage in such districts as Tanjore, Coimbatore and Bellary.

10. Considerable progress was made during the year in the introduction of improved ploughs and other implements. The Director reports that Messrs. Massey and Co., of Madras, sold no fewer than 587-206 being their "improved country ploughs," while of the Swedish ploughs imported by Government, considerable numbers have been sold in Kurnool and Bellary. Next to the ploughs of Messrs. Massey and Co., the Beheea sugar mill of Messrs. Thompson and Mylne has met with most success. This firm has for some years had an agency at Cocanada, by means of which the mill has become widely known and used in the Godávari District. In 1883, they established an agency at the presidency, and forwarded at their own expense mills for exhibition in several districts. The result for the first eight months of 1884 is that the Madras Agency has sold 81 mills, of which 75 have gone to the Hospet Taluk, Bellary District. A set of so-called "ryot's implements" was imported for trial at the Government Farm, but no final conclusion can as yet be formed as to their merits. The Government entirely concur with the remarks of the Board of Revenue as to the uselessness of importing a seed drill costing Rs. 77 in spite of the fact that the ordinary country drill is as efficient an implement as can be desired, and they trust that, in future, greater judgment will be shown in such matters.

11. The Government note with interest the marked improvement in the fibre extracted on the farm from the Manilla hemp. Steps should be taken to ascertain the best method of separation and preparation, as well as the market value of the present farm product. Reports should also be called for from the several persons to whom China silkworm seed was supplied for experiment in December 1883.

12. No further experiments seem to have been made, as directed in G.O., dated 10th September 1883, No. 1095, for the purpose of determining to what causes variations in the colour of Nankin cotton are due, nor would any distribution of Eucalyptus seed appear to have been made in the districts, as desired by Government when reviewing the report for the previous year.

13. In the months of July and August 1883, the Assistant Superintendent of Farms was deputed to the Godávari and Kistna districts for the purpose of reporting on the tobacco parasite *Nicobanche Nicotiana*, certain diseases of the paddy plant, the cultivation of sugar-cane, and other matters. Special reports on this very useful tour of inspection were submitted at the time and reviewed by Government, and a number of notes on single subjects, based principally on the information thus collected, have since been published and distributed by the Director of Agriculture.

14. *Cattle-breeding and Veterinary Establishments.*—The Government entirely agree with the Director and the Board of Revenue in the opinion that, in the improvement of the live stock of the country, the ryot must be influenced by example and not by legislation. At the same time, it should not be forgotten that the more examples are multiplied, the greater will be their effect. Mr. Benson's remark that "rams should be distributed, not by tens or dozens per annum, but by hundreds, to do much good," is, therefore, strictly to the point, and the Government do not doubt that, if the course he suggests could be adopted in any one district, as, for instance, Coimbatore, very perceptible benefit would result in no long period of time. It is, of course, impossible to breed on the requisite scale at Saidápet, but the ultimate aim of all such operations should none the less be kept in view, and every encouragement and assistance afforded to landowners and others who may wish to engage in stock-breeding in the districts.

15. The report on the working of the Cattle Disease Department is very satisfactory. The Government note especially the rapid advance of the Veterinary Hospital in the estimation of the public, and the excellent effect produced by the Inspector's visits to the Madras slaughter houses.

16. *Agricultural and Trade Statistics.*—The chief event noticed by the Director under these heads is the holding of a Statistical Conference at Calcutta in December 1883, for the purpose of revising the forms of statistical returns which accompany the provincial administration reports. The forms adopted by the Conference, at which the Director of Agriculture represented the Madras Government, have received the approval of the Government of India and will shortly be introduced with some slight alterations.

17. Excluding the pay of the Director, the charges of the year aggregated Rs. 92,224 against Rs. 77,444 in 1882-83, the increase being due to the development of the new department of Cattle Disease Inspection in accordance with the sanctioned scheme. The School of Agriculture having now been transferred to the Educational Department, the charges on account of that institution will no longer appear in the returns of the Agricultural Department. The receipts of the year amounted to Rs. 45,463, of which Rs. 34,254 represent the contribution from surplus pound funds, Rs. 10,663 the receipts of the Government Farm, and Rs. 546 those of the School of Agriculture and Cattle Disease Department. Details as regards the Farm receipts should have been given.

	1882-83. RS.	1883-84. RS.
General Supervision ...	23,285	25,219
Saidápet Farm	10,830	14,767
School of Agriculture ...	24,843	23,851
Estate Improvements, &c. ...	2,487	2,035
District operations	7,190	3,249
Cattle Disease Inspection ...	8,809	23,103
Total ...	77,444	92,224

18. In conclusion, the Government have only to observe that the operations of the department since its establishment on its present footing have been well considered and carefully adapted to the ends in view, and that its progress has been as satisfactory and as rapid as could reasonably be expected in the time.

(True Extract.)

(Signed) H. E. STOKES,
Secretary to Government.

To the Board of Revenue.
,, the Director of Revenue Settlement and Agriculture.
,, the Public Department.
,, the Public Works Department.
,, the Accountant-General.
,, the Director of Government Cinchona Plantations, Parks and Gardens, Nílgiris.

No. 1412-A.

Copy to the Government of India, Revenue and Agricultural Department.

(Signed) H. E. STOKES,
Secretary to Government.